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174 MODERNIZING FARMHOUSES

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FARMERS' BULLETIN NO. 1749
U.S. DEPARTMENT OF AGRICULTURE

OLD FARMHOUSES that are sturdy and sound can often be brought up to modern standards of comfort, convenience, and appearance for less than the cost of a new house. This has been done with surprisingly small outlays of cash where the farmer has contributed considerable proportions of the materials and labor from sources available on the farm.

The Department of Agriculture is cooperating with the State agricultural colleges to provide plans and other information helpful in planning home improvements. Prospective builders should consult their local War Boards and find out about the availability of materials and the limitations on the amount of money that may be spent for remodeling or for new buildings. As lumber, especially that less than 2 inches thick, is a very critical material, it should be replaced wherever possible by masonry or other lumber-conserving materials, particularly in sections where home-sawed lumber is not available.

The following publications will aid persons planning house repairs:

Farmers' Bulletins:

- 1087 F. Beautifying the Farmstead.
- 1426 F. Farm Plumbing.
- 1448 F. Farmstead Water Supply.
- 1452 F. Painting on the Farm.
- 1572 F. Making Cellars Dry.
- 1590 F. Fire Protective Construction on the Farm.
- 1660 F. Logs and Poles in Farm Construction.
- 1698 F. Heating the Farm Home.
- 1720 F. Adobe or Sun-Dried Brick for Buildings.
- 1738 F. Farmhouse Plans (10 cents).
- 1751 F. Roof Coverings for Farm Buildings and Their Repair.
- 1772 F. Use of Concrete on the Farm.
- 1889 F. Fireplaces and Chimneys.
- 1911 F. Preventing Damage to Buildings by Subterranean Termites and Their Control.
- 1950 F. Sewage and Garbage Disposal on the Farm.

Circular 406 C. Oil Burners for Home Heating.

Department of Commerce Publication 15. Care and Repair of the House (15 cents).

Department of the Interior Conservation Bulletin 19. Rat Proofing Buildings and Premises (10 cents).

The above publications may be purchased from the Superintendent of Documents, Washington 25, D. C., at 5 cents each, except as otherwise stated.

MODERNIZING FARMHOUSES

By WALLACE ASHBY, *Chief*, and WALTER H. NASH, *architect*, Division of Farm Structures Research, Bureau of Agricultural Chemistry and Engineering¹

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INTRODUCTION

MANY FARM FAMILIES, even under the handicap of depression years, have undertaken home improvements. They wish to correct such things as crowded quarters, awkward arrangement of rooms, too many steps to go up and down, out-of-date water supply, bad lighting, rough floors, or a run-down condition in any part of a house. This bulletin is intended to help such families plan the changes that may be needed.

Improvements can be made a step at a time, as income and farm work permit. Often the work can be done by members of the family, with materials obtained in the neighborhood. With little or no cash outlay for labor, and with lumber, brick, stone, slate, sand, and gravel from nearby, or with adobe, where the earth is suitable, the cash required should be hardly half as much as if both labor and materials were obtained at commercial prices.

Sometimes, of course, there will be a question whether to remodel or to rebuild. Is the old house itself still sound enough to warrant spending time and money on it? Even if it is not sound, has the house associations too precious to lose by its destruction? Is not the cost of modernizing some of the old farmhouses, especially along the eastern seaboard and in sections of the South, even though as great as the cost of a new one, worth while if it will preserve a historic landmark or save the traditional charm of some old family homestead?

¹ The assistance of the Farm Housing Survey workers who gathered the material used in this bulletin and the kindness of the farm families and local builders who made the information available are hereby gratefully acknowledged.

APPRaising THE OLD HOUSE

The condition of the old house and the cost of putting it in good repair should be checked by a competent builder as the first step in planning improvements. This frequently shows ways of combining the repair and remodeling work to greater advantage.

Unavoidable interference with the use of the house during building operations may be minimized if a temporary kitchen or sleeping quarters outside the house are available during the building period, or if persons not needed at home can spend the time elsewhere.

If a change of location² seems desirable because of an inconvenient or unfavorable location as regards main roads and fields, or poorly placed, run-down buildings, neither extensive remodeling nor new building should be considered, but the installation of equipment that can later be moved to a new house may be feasible.

ELEMENTS OF MODERN HOMES

When a house is to be modernized careful consideration should be given to all elements which affect its livability. A poorly planned house will never be satisfactory regardless of the amount spent on utilities. To install equipment only to find later that it is inconveniently located or that it must be moved to make changes in the plan which should have been made first, is a waste of money. It is equally unwise to install expensive equipment in a dilapidated or poorly constructed house. A structure having poorly constructed walls, floors, or ceilings usually requires a larger heating plant and more fuel to heat it properly than a tight and well-insulated structure. New heating equipment may be unnecessary if the house is insulated and air leakage cut down.

When the remodeling which is discussed in more detail on page 27 is being planned, the location of all plumbing, heating, and lighting fixtures should be carefully studied and even if they are not to be included at first, space should be provided so they may be installed later without the necessity of radical changes in the plan or structure.

WATER AND PLUMBING

A kitchen sink is probably the most useful single home convenience. A suitable one may be bought and installed for \$12 to \$25 complete with drain. It is frequently the first step in a lay-out that grows step by step into a complete plumbing system. The second step might be a hand pump at the sink, piped to draw from a nearby cistern or shallow well. The pump can be connected also to a boiler heated by the kitchen range, with a simple valve arrangement to permit pumping either cold or hot water as desired. Later the hand pump can be replaced by a power pump and pressure supplied from an elevated tank or from a hydropneumatic (water-air) tank. A bathroom and septic tank can be added when finances permit.

A hydropneumatic water system may be placed in the cellar if the water is drawn from a cistern or shallow well near the house. If the water is deep the pump cylinder must be in the well, with headroom above for lifting the pump and pipes for repairs. A good location for a deep well is 4 to 8 feet outside the house in an extension of the cellar, with a trap door above to permit lifting out the pipes.

² Small or medium-size farm buildings can be lifted with jacks or levers, mounted on skids, and hauled with teams, tractors, or cable and winch. Heavy tractors of the type used for road grading are best for such work. Frozen ground favors hauling, and greased skids or rollers lighten the draft. Buildings that cannot be moved profitably have salvage value, especially if the wrecking work can be done at slack times.

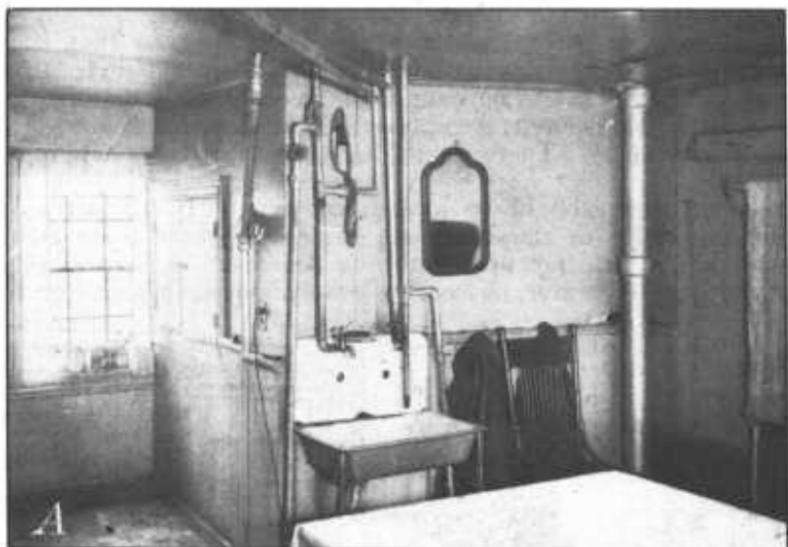


FIGURE 1.—*A*, A poorly located sink, distant from the other kitchen work centers and interfering with dining space and with travel to and from the door. *B*, The sink in the same kitchen centrally located after remodeling. Drawers under the drain board open from either side; the coal range is at the right.

The kitchen sink is an important work center and should be located advantageously. If far from the work table, stove, and storage cabinets it is not very useful (fig. 1, *A*). A central location (fig. 1, *B*) is sometimes best in large kitchens. A good arrangement places the sink between the drain board and work table, with cabinets convenient, in a well-lighted location (fig. 2). Materials for drain boards and shelves cost little and these conveniences can be

made by any man handy with tools. A large sink, 20 by 30 inches, will hold a dishpan and dish drainer at one time.

A lavatory or wash sink near the back door so that the men can wash before entering the house helps to keep out dirt. In warm climates, where there is no danger of freezing, the lavatory may be placed on the back porch; it is preferably located in an enclosed washroom or rear entry. There should be hooks nearby for hanging outer wraps.

The bathroom should be located convenient to all parts of the house, especially to the bedrooms; unless there is more than one bathroom it should not open into any bedroom. A stationary bathtub with running water, or even a shower, is desirable, and an indoor

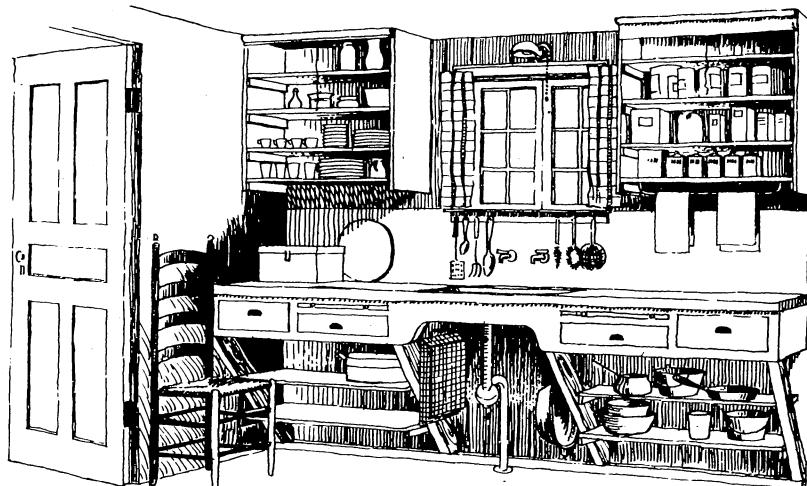


FIGURE 2.—An inexpensive installation of sink with home-made cabinet, drain board, and shelves. Roller shades are used instead of doors on the cabinet. Doors to protect utensils on the lower shelves could be provided at small cost. (Department of Agricultural Engineering, University of California.)

toilet is conducive to the health of all the family especially the old, the ill, and the very young. A toilet requires a 3-inch pipe stack connected to the sewer below and extending up through the roof, and it should be placed so that the stack can be located in partitions or in unused corners of the rooms above and below.

Costs of various plumbing installations as reported by the Farm Housing Survey are given in the following tabulation. The figures are for simple types of equipment, and include the value of the work performed by the farmer as well as his cash outlay.

Item of improvement:	Cost, installed
Pitcher pump in house, connected to cistern or shallow well	\$12 to \$18
Hand force pump with storage tank and piping, connected to cistern or shallow well	40 to 75
Pressure water system with electric pump, connected to cistern or shallow well	95 to 150
Kitchen sink with drain only	12 to 25
Kitchen sink with connections to water and sewer systems	20 to 30
Range boiler with water back	20 to 30
Septic tank with house sewer and distribution tile	35 to 60
Indoor flush toilet with water connections, stack, waste, and vent piping	40 to 70
Lavatory with water, waste, and vent connections	20 to 30
Bathtub or shower with water, waste, and vent connections	40 to 70

ELECTRIC POWER

Electricity has many advantages for lighting, for refrigeration, for operating washing machines, irons, vacuum cleaners, and radios, for cooking, for heating water, and for other purposes. Electricity also makes possible automatic water systems and thus contributes to the use of plumbing.

Cost of connection to a power line varies with the distance of the house from the power line and the policy of the power company. The Farm Housing Survey reported the costs of connections and house wiring together as ranging from less than \$100 to more than \$500. In some of the Western States, where large amounts of electricity are used for pumping water for irrigation, the average consumption per farm in 1929 was 7,080 kilowatt-hours, and the average charge was 1 $\frac{3}{4}$ cents per kilowatt-hour. The average use per farm in the remainder of the United States was only 746 kilowatt-hours per farm, and the average charge 8 $\frac{1}{2}$ cents per kilowatt-hour. These figures give a good idea of the relation of large use to low unit cost.

Individual home lighting plants are generally satisfactory, though less so than connection to a power line on account of limited capacity and need for servicing. Some types supply 115-volt, 60-cycle alternating current, the same as that from most power lines, so no change in motors is needed when transfer is made to power-line current. Proper wiring for an individual plant requires little change for power-line service. An individual lighting plant with house wiring usually costs, installed, from \$200 to \$500, according to the capacity.

Electric wiring is installed best by skilled workmen, but many farmers have done satisfactory jobs on their own houses and other farm buildings.⁸ The cheapest electric light wiring provides merely a ceiling fixture in each room, with the current turned on and off by a pull cord from the light socket. A connection for a washing machine or other electric appliance can be added by dropping a cord and socket from the light wires. The wiring may be of the "knob and tube" type or may make use of metal- or fabric-covered cable, and may be either exposed in the room or concealed in the hollow spaces of the wall and ceiling. Concealed wiring is desirable for the sake of appearance, though metal- or fabric-covered cables carefully placed and painted to match walls and ceilings are not especially noticeable. Materials and fixtures for the simplest system need cost only about \$2.50 per room.

If a larger investment can be afforded, wall switches for the ceiling lights and an abundance of convenience outlets in the walls for plugging in portable lamps and other appliances are recommended. Figure 35 shows a moderate-cost lay-out of lights and convenience outlets for a typical farmhouse. There is a central light in each room, and a duplex convenience outlet or socket in the baseboard between each pair of doors so that portable lamps or other equipment can be plugged in. Bracket lamps are recommended beside the shaving mirror in the bathroom and over the kitchen sink. In the larger rooms the central light is controlled by a switch near the

⁸ Instructions are given in Extension Bulletin 204, Electric Wiring for the Farm, issued by Cornell University, Ithaca, N. Y., and costing 20 cents per copy outside of New York State. Instructions on wiring may also be obtained from some State experiment stations and some dealers in wiring materials.

door. The light in the hall over the stairway and the light over the basement stairs are controlled by three-way switches so that the light can be turned on or off from either the top or bottom of the stairs. A fixture to light the driveway and path to the barn might be mounted either on the side of the house or on a pole out of doors. It also would be controlled by three-way switches, one at the back door and the other at the barn.

A few suggestions for locating lights and conveniences are the following: Put a switch on the lock or knob side of a door; locate outlets so that the cord to a lamp or other appliance does not have to be pulled across a doorway; place a light so that it throws no shadows on your work or on stair steps; use insulated sockets and pull cords near plumbing fixtures to avoid danger of shocks.

Good lighting depends on plenty of light without glare. In general, lamps that throw only a small spot of bright light without illuminating the rest of the room are not desirable.

IMPROVED HEATING

Farmhouses may be heated by fireplaces, stoves, circulator heaters, or central heating systems circulating warm air, hot water, or steam. The so-called "pipeless (one-pipe) furnace" and the piped warm air, steam, and vapor systems as ordinarily used in domestic heating require cellars, and for a hot-water system a cellar is desirable though not necessary.

A fireplace gives out radiant heat that warms persons and objects without raising the air temperature and lowering the relative humidity as much as do other ordinary heating systems. Some authorities regard the use of radiant heat as more healthful than other methods of heating. A large part of the heat from a fireplace passes up the chimney and is lost, but this loss is less in certain commercial types of fireplaces that have metal backs with provision for circulating heated air into the room.

Stoves utilize fuel more efficiently than do fireplaces. In cold climates a stove is needed for each 2 or 3 connecting rooms, or for each room if the doors between are kept closed. Chimneys must be so located that proper flue connections can be made. Ordinary ranges, cookstoves, and laundry stoves will usually warm the rooms in which they are placed.

Circulator or parlor heaters have metal jackets, which increase the circulation of air in the room and give better distribution of heat than is obtained with ordinary stoves. The larger sizes warm 2 to 4 connecting rooms satisfactorily. These heaters harmonize better in appearance with other furniture than do stoves, and the comparatively cool outer surface is less likely to burn children or clothing. Circulator heaters that burn kerosene or the lighter distillate oil fuels reduce the labor and muss of caring for the fire. In most sections the cost of these fuels is higher than that of coal.

Central heating systems well designed, installed, and operated give uniform and easily controlled temperatures in all parts of the house where heat is wanted. Such systems require less attention than stoves, and if placed in the cellar or in a special heater room they avoid dirt and muss in the living quarters. They burn various grades of anthracite, bituminous coal, coke, or chunks of wood, and may be fitted with gas or oil burners. Since they heat the house

more completely than stoves, they usually burn more fuel. The selection and location of heaters for the modernized houses shown in this bulletin are discussed in connection with each plan.

Reports from the Farm Housing Survey indicate that the ordinary costs of heating equipment, including installation, are about as follows:

Item:	Cost per room
Circular heaters	\$10 to \$20
Pipeless furnaces	20 to 30
Piped warm-air furnaces	35 to 45
Steam systems	50 to 75
Hot-water systems	60 to 85

The survey figures did not show much variation for different parts of the country. Apparently differences in climate are largely offset by use of smaller rooms, lower ceilings, and warmer house construction in the colder regions. Steam and hot-water heating systems are little used in the warmer areas.

ADEQUATE PROTECTION FROM THE WEATHER

Leakage of air around windows and doors, which causes great loss of heat in many houses, can be almost stopped by the use of weather-stripping or by tightly fitted storm windows and doors which also cut down heat loss by forming additional air spaces. Air leakage around door and window frames in wood frame and masonry walls may frequently be reduced by calking with oakum, calking compound, or similar material. Where walls have settled and there are large cracks, it is necessary to reset the frames to remedy this condition.

Warmth and safety from fire are increased by closing openings between the wall studs from the cellar to the attic for which pieces of plank, bricks, tin, or plaster on metal lath may be used in the cellar (fig. 3) where most fires start. Insulation board, which is easily cut and fitted, answers well for closing the spaces at the top.

A method which has the added advantage of cutting down heat transfer through the walls is to fill the stud spaces with insulation. This can be done without removing the siding. The best plan is to employ a company having equipment for blowing the insulation in, which insures the filling of all spaces. In cold climates, particularly if a heating system is used which introduces moisture into the air of the house, it is desirable to provide a moisture barrier where walls are insulated in this manner.⁴

Another method is to apply building paper and nailing strips over the old siding, and shingle the walls. In addition to reducing air leakage this method provides an additional air space and so cuts down heat loss by conduction.

Masonry walls to which plaster has been applied directly are usually cold in winter and permit considerable heat loss. They frequently become damp because of the condensation of moisture. If furring strips are fastened to the inside of these walls and lath and plaster,

⁴ See Condensation Problems in Modern Buildings. Mimeographed. Forest Products Laboratory, Madison, Wis.

wallboard, or other finish is applied the walls will be much warmer, and heat losses will be reduced.

Fuel savings can be made and comfort improved by applying fill insulation over the ceiling or by laying sheet insulation or tight flooring on the joists. All openings in the attic space should be closed to prevent drafts of cold air reaching the ceiling below. Sheet insulation can likewise be used to advantage on the backs of walls next to cold spaces, as on the walls of the upper rooms in a story-and-a-half house. The same insulation that protects from cold in winter aids in keeping the house cool in summer. For summer comfort, insulation should be supplemented by ample cross ventilation of the rooms and ventilation of the unused spaces under the roof. New and comfortable

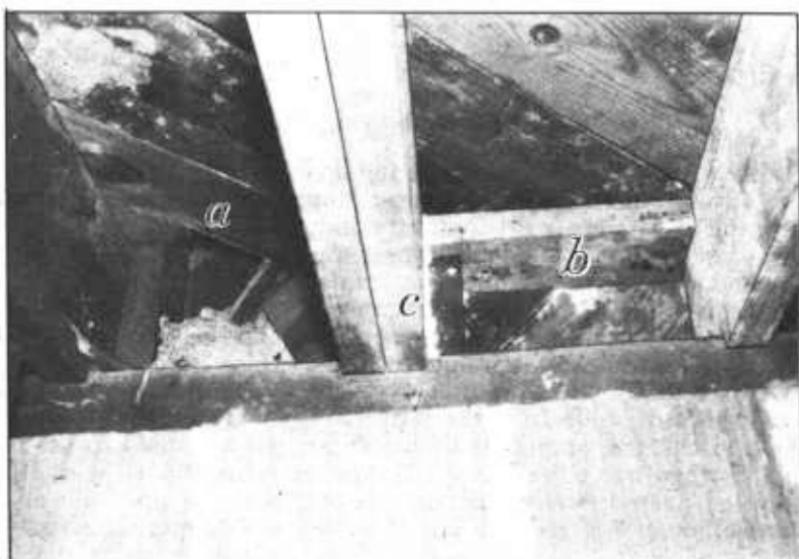


FIGURE 3.—Stopping openings to stud spaces: *a*, opening left by builders, with plaster fallen through; *b*, piece of 2 by 6 tightly fitted to close opening; *c*, rock wool used to caulk cracks.

bedroom space can sometimes be provided economically in the attic, as in house 12, by insulating the roof and providing for cross ventilation.

In all but very warm climates double floors with building paper between should be provided on the first floor; if over an unexcavated or unheated area, the floors should be insulated.

SATISFACTORY LIVING SPACE

In the majority of cases, the remodeling of a farmhouse involves building an addition to increase the amount of living space. Some instances involve merely an addition to or rearrangement of partitions for the greater convenience of the occupants, or the dividing of a large house to accommodate two families. The trend is toward

larger living rooms than those provided in the older houses and fewer bedrooms than were desirable in the days of larger households.

To better adapt the house to present requirements, the living room is enlarged—or added—in most remodeling undertakings and made more attractive. But because the living room needs to be centrally located it is usually given space in the old part of the house, while the addition is most often made a bedroom to replace sleeping space taken for the living room, a bathroom, a hall, or closets. Studies of kitchen work and the use of modern equipment have resulted in much more compact and efficient arrangements for the kitchen, where modernizing seldom requires additional space but frequently necessitates moving doors or windows.

CELLARS

In cold climates a dry cellar is the best place for the heating plant and fuel. A space 12 by 15 feet will accommodate them. A good cellar is also very useful for storing fruits, vegetables, and canned

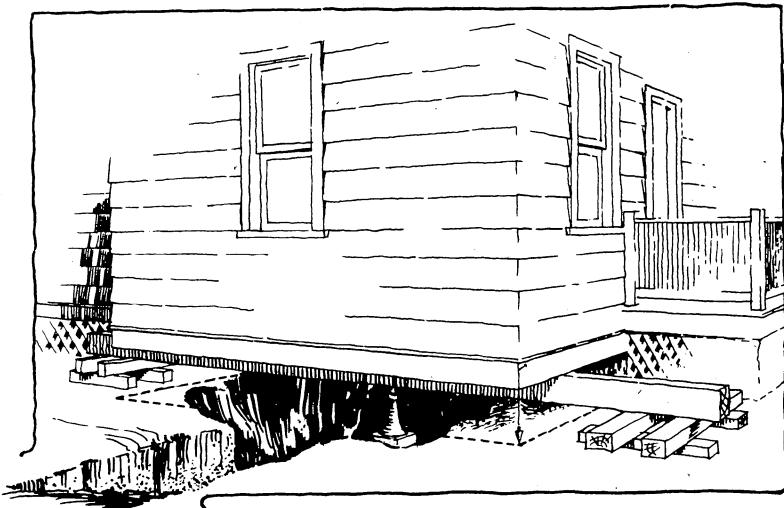


FIGURE 4.—Method of supporting house on timbers and jack during excavation of cellar.

goods, and is sometimes the best place for the laundry and the water system or lighting plant. A cellar under part of the house will often provide all the room needed.

Hillsides offer unusual advantages for cellars, if protected from seepage. Little excavating is necessary, and doors and windows can be located to make the cellar an ideal workroom. Under favorable conditions the kitchen and dining room may be located there, or the space may be used for a play room. If the heating plant is in the cellar, plaster on metal lath, gypsum board, or other fire-resistant board under the first-floor joists and under the stairs to the second floor helps to prevent serious fires. Sewer lines for future plumbing should be laid before a concrete floor is put in.

When a cellar is to be built under a house the house may be supported as shown in figure 4. A number of timbers and jacks are

needed if the structure is to be raised. Otherwise timbers should be blocked, wedged, or jacked into place to hold the weight but not raise it. Raising the house unevenly or allowing it to settle is likely to crack plaster. The earth may be removed with a slip scraper drawn by a long chain or rope, or with a wheelbarrow. If the work is hired and all materials purchased, cellars for new farmhouses usually cost 50 cents to \$1 per square foot of floor space, and cellars dug under existing buildings cost somewhat more.

CLOSETS

There should be one or more closets for each bedroom (fig. 5), a linen closet in or adjacent to the bathroom, a broom closet near the kitchen, and a closet or at least hooks on the rear porch or in the rear entry to provide for hanging outer work clothes. A closet in the hall or living room is convenient for coats and visitors' wraps.



FIGURE 5.—A well-designed closet. (Oregon State Agricultural College.)

itself many times over through the advantages gained in room arrangement. Various types of stairs are commonly used in farmhouses; that with grade entrance and landing (fig. 43) is very good where there is a cellar.

For a much-used stairway a rise of $7\frac{1}{2}$ inches in 10 inches of run (fig. 6) is desirable. Stairs having greater than $7\frac{3}{4}$ inches rise are steep. Basement and attic stairs are frequently steeper; an 8-inch rise in 9 inches of run or a 9-inch rise in 8 inches of run is often found. Regardless of the height of the riser there should be a proper relation between the rise and run. A good rule to follow is that the sum of the rise and run should equal 17 or $17\frac{1}{2}$ inches. It is also important that there be no variation in the risers and treads in the same flight of stairs. Stairs should be not less than 3 feet wide. One may stumble on wind-

GOOD STAIRS

Many stairs can be greatly improved by hand rails and better lighting; the only satisfactory remedy for others is complete rebuilding. Sometimes an entirely new stair location is demanded (see house 15). The expense of tearing out an old stairway and rebuilding will often pay for

ing stairs, and it is difficult to move furniture up and down them. If a winding stairway must be used, on account of limited space, it should be provided with a handrail and be well lighted.

The stair well should not be left open higher than is needed to give headroom over the stairs. Use the upper part of this otherwise waste space for bedroom closets as shown in the upper left-hand part of figure 6. This also saves needless expense and trouble in trying to reach the upper part of a high stair well when papering or cleaning.

WELL-FINISHED FLOORS, WALLS, AND CEILINGS

Smooth, tight, well-finished floors are easily kept clean. Floors streaked with splinters or deep grooves should be sanded smooth. If the condition is too serious, lay a new floor over the old. This

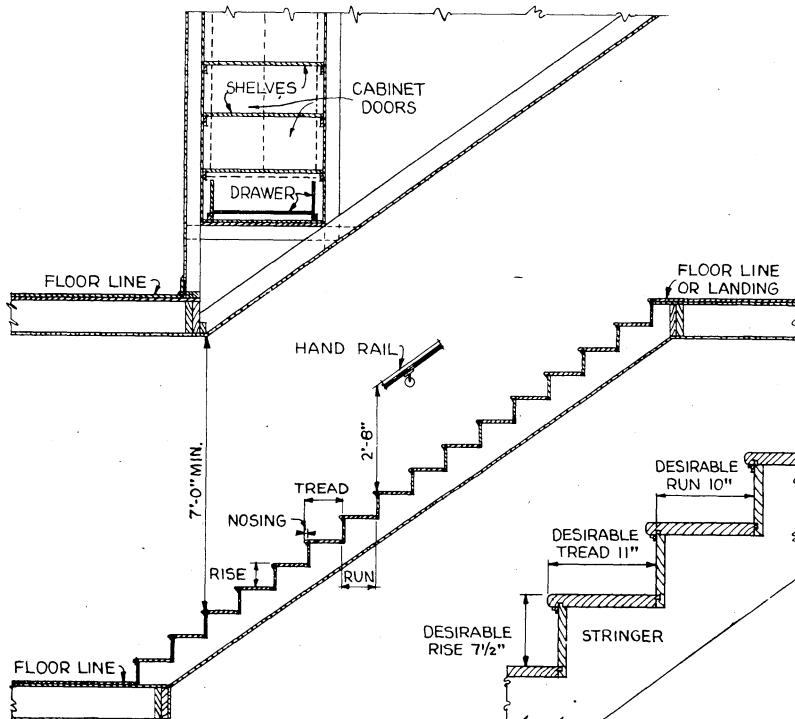


FIGURE 6.—Stairway details.

also adds stiffness to the floor. There are many satisfactory varieties of wood, and linoleum is well liked for many purposes. Concrete is often used for workrooms and porches, and there is a patented method of placing a thin concrete wearing surface over old wood floors. There are also several new manufactured flooring materials which deserve consideration. Choice will depend to a large extent on local supply and price.

If new floors are to be laid, make them level. An old floor out of level because of the settling of walls or girders often may be corrected by jacking the girder back to place or by wedging under the

ends of the joists. A sagging floor can usually be given a level surface by using long shims nailed in place under new flooring, or

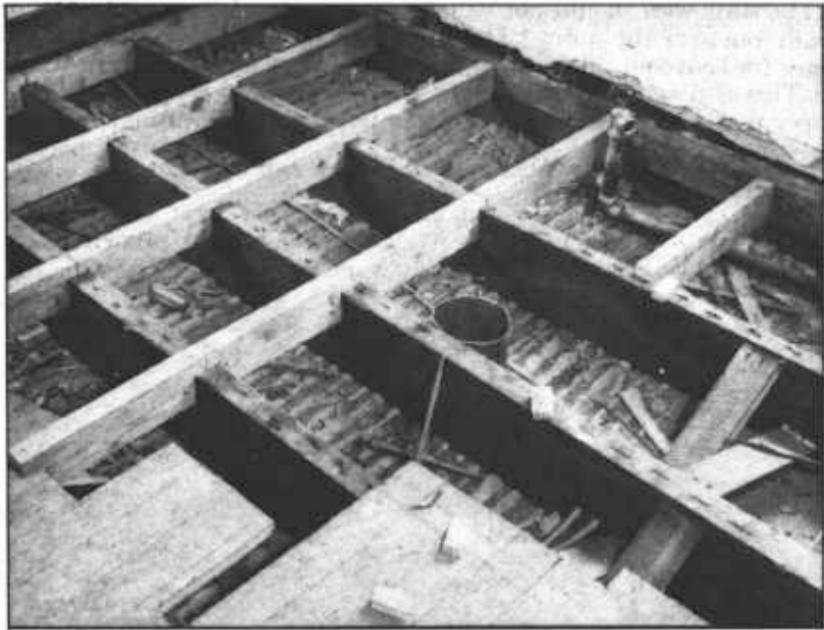


FIGURE 7.—Leveling floor with blocking.



FIGURE 8.—Insulation board being applied over plastered ceiling, with wood strips to give nailing base, and sound-deadening material used next to old plaster.

blocking can be used, as illustrated in figure 7, when the old floor is badly out of level. If sagging is due to undersized joists, as is fre-

quently the case, additional supports should be installed or the joists doubled before new flooring is laid.

Interior walls and ceilings may be repaired and refinished in a number of ways. When only a small area of plastered wall or ceiling needs repair, the work can often be done by the owner. Ready mixed plasters are convenient for this purpose.

Repairing or replacing a large amount of plaster causes much dirt and disorder. Covering the old wall with a new surface may



FIGURE 9.—Composition board used as an interior finish.

therefore be desirable. Gypsum sheets, wall board, insulation board, plywood, wood boards, or metal sheets may be used, each having certain advantages of utility or price. Where protection from heat, cold, or noise is a consideration, insulation board has an advantage as an interior finish, especially on ceilings or the upper parts of walls where it is not subject to mechanical injury. A wainscot of horizontal or vertical boards may be used on the lower parts of the walls. Insulation board on the lower parts of walls should be protected by gypsum plaster or other hard surface; lime or cement plaster is not suitable.

When applying these materials over old plastered surfaces, all loose or badly broken plaster should be removed. It is best to apply the sheets over 1 by 2 inch wood strips spaced to fit the material but not more than 16 inches apart (fig. 8). These strips can be securely nailed to the joists or studs through the plaster with eightpenny nails, and should be shimmed to provide a level base for the new surface.

Some insulation and composition boards are made to give tiled or paneled effects, and the joints are part of the decoration, as illustrated in figure 9. Some of the boards are finished at the factory and

do not require painting on the job. When large plain sheets are used, attention must be paid to the joints, since most of these materials will shrink and expand a little. Manufacturers' instructions should be followed. Joints may either be covered with strips or be left open about one-eighth inch. In either case the sheets should be

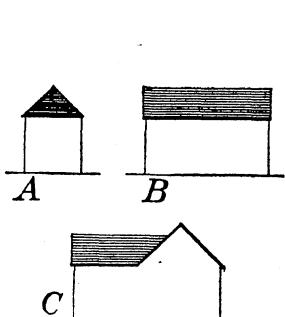


FIGURE 10.—A square outline (A) lacks variety, an oblong outline (B) obtains variety in greater length than height, and an irregular outline (C) gives still greater interest to the silhouette.



FIGURE 11.—Windows, doors, and chimneys add interest, because they indicate use, in either a house (A) or a barn (B).

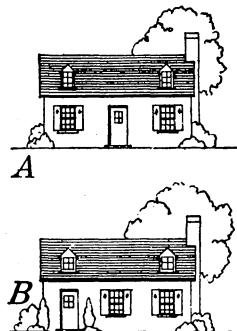


FIGURE 12.—Balance can be achieved with either symmetrical (A) or nonsymmetrical (B) arrangement of doors and windows.

arranged in regular patterns. When wide boards are used as an interior finish, the edges may be beveled or may be covered with battens for decorative effect.⁵

TWO-FAMILY FARMHOUSES

While it is an old custom for farm families to retire to town, leaving a married son or daughter on the farm, there are also examples of retiring farmers who have found it more satisfactory to stay on the land. This practice helps to reduce the cost of living, the older people's experience and active assistance help to increase the farm income, and their savings are more likely to be used in ways that improve rural life than if they moved to town.



FIGURE 13.—An example of poor balance.

The two families should be provided with separate living quarters, for each will have some interests in which the other does not join. One way is to provide two houses; but a more economical way, where the existing



FIGURE 14.—A porch should harmonize with the rest of the house: A, Porch with roof lines lacking in harmony; B, porch with harmonious roof lines.

⁵ Suggestions on interior finishes will be found in Department of Commerce bulletin House Insulation (10 cents); in Modern Home Interiors (10 cents), published by the National Lumber Manufacturers Association, Washington, D. C.; and in catalogs of manufacturers of interior-finish materials and millwork.

farmhouse is large and in sound condition, is to divide it into two separate apartments. House 18 is an example of how one type of farmhouse can be made into a two-family dwelling.

EXTERIOR DESIGN

A pleasing exterior of the farm home is not to be assured without careful study of the various elements that form the completed picture. These elements are the walls and roof, which influence the proportions or mass effect (fig. 10), and the windows, dormers, doors, porches, entries, chimneys, exterior trim, and paint, which are means of attaining interesting detail (fig. 11). The relation of height to width should be studied for mass effect. A building kept "close to the ground" seems to grow from the soil and has the appearance of solidity, but a house on too high a foundation gives an impression of restlessness.

Doors and windows should be spaced to produce a pleasing arrangement, which may be either symmetrical or nonsymmetrical. Either arrangement can produce an effect of balance (fig. 12), but poor balance is likely to result if windows and doors are merely openings through the walls without regard to location and size (fig. 13).

From the standpoint of appearance, a porch is often difficult to add to a home satisfactorily. For example, in figure 14, *A* the porch appears to be but an extended strip of the main roof bent across the front. It is obviously a cheaper type of construction than the rest of the house and is therefore out of keeping with it. In figure 14, *B* the porch reflects the construction and roof lines of the house and is therefore more in keeping with the design as a whole; it appears to be more definitely a part of the house than does the other, which looks like a lean-to.

Proposed changes should be studied on paper before construction begins. Only by means of scale drawings can the proportions of the composition be seen and reasonable assurance obtained that the result will be satisfactory.

The exterior of the completed building should reflect the interior arrangement of rooms which is governed by the requirements of living. For economy in construction the plan should be simple and straightforward, with the least possible number of angles and breaks. The location of doors and windows should be studied with regard to the exterior appearance of the completed structure, and to the furnishing of the rooms as well as with regard to convenience, light, and ventilation. In adding space to a house, the style of the old building as well as the new needs should be considered.



FIGURE 15.—A neat and inexpensive dormer with close-fitting eaves.

The details of an addition should correspond to those of the original structure. Whatever the style of the old house, simplicity should be the watchword in making improvements. Glaring examples of over-decoration are the elaborate and fantastic designs of many houses built

at the turn of the last century. But the colonial and New England farmhouses built in the latter half of the eighteenth century and the early part of the nineteenth century, when economy was necessary, still stand as models worth imitating. These homes are adequate proof that simplicity of design is more enduring than elaborate ornamentation.

ROOFS, DORMERS AND EAVES

The roof should cover the house in the simplest and most effective way, avoiding complicated hips and valleys. The pitch of an addition should conform to that of

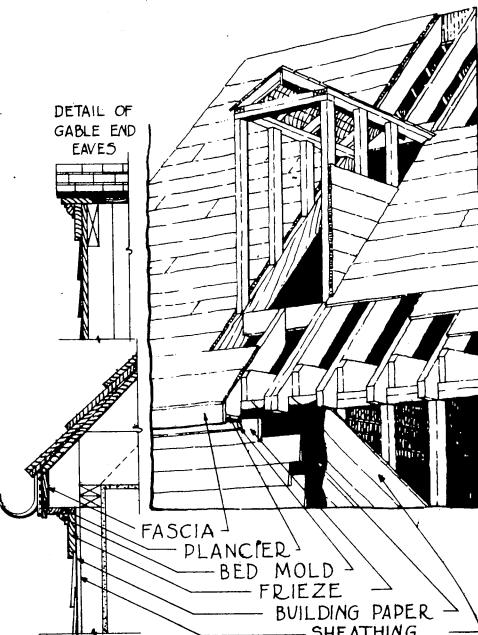


FIGURE 16.—Construction details for dormer and for eaves.

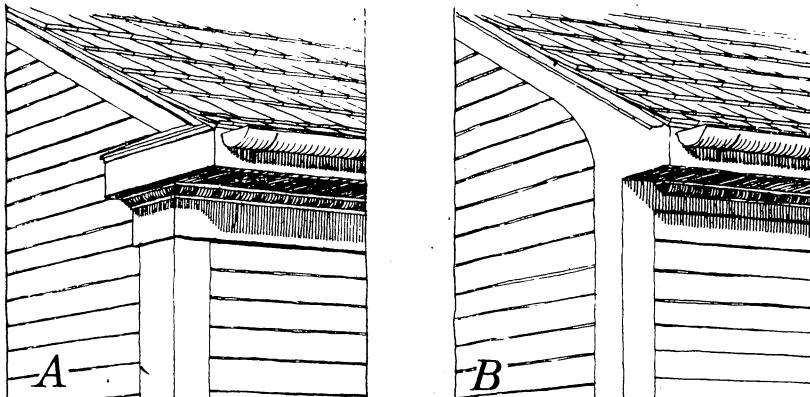


FIGURE 17.—Box cornice at gable ends: A, Cornice built with return against gable; B, cornice cut flush with the end of the building.

the original house, unless the use of the new attic space furnishes a good reason for change.

Dormers admit light and air to the space under the roof, and often are needed to permit use of that space for living. When properly used they add to the appearance of the house.

Dormers should be kept as small and compact as lighting and ventilation will permit. Figure 15 illustrates a type that is simple in construction, unpretentious, and practical. To obtain narrow casings, spring balances or spring bolts should be used instead of sash weights. A pair of casement windows instead of the double-hung sash would give twice the opening for ventilation. Casement windows in dormers are most satisfactory on the sheltered side of the house. They should swing in, and must be carefully designed and constructed if they are to keep out driving rains. Weather strips aid in making them tight. Construction details for a dormer are shown in Figure 16.

The appearance of the house is often improved by neat, close-fitting eaves, especially at gable ends. They give a simple effect, are economical, and help to keep the house from being damaged by windstorms. Figures 16 and 17 illustrate their use and construction. The appearance of an old house often may be brought up to date by trimming wide eaves to modern lines and removing "gingerbread" decorations.

WINDOWS AND SHUTTERS

The interior arrangement of a house may be entirely satisfactory, and yet on the exterior the wall openings may appear awkward. This fault cannot always be entirely avoided in remodeling an old house.

Low window sills are less desirable than high sills, especially on upper floors. The former give a sense of insecurity in the room and add to the difficulty of placing furniture. A height of 32 inches is fairly safe against children falling out and permits placing a bed or table in front of the window.

Shutters are a question of personal taste. As a matter of utility they offer shade and ventilation in hot weather, and protect first-floor rooms against intrusion at night when windows must be left open or when it is necessary to leave the house unoccupied. On the other hand, if the shutters are to be closed, outside screens of full height can be used only with special window frames.

The ornamental value of shutters is illustrated in the suggested remodeling for house 4 (fig. 28). With the long, low house shown, the windows without shutters would appear somewhat lost. The shutters give an effect of greater width to the window openings, which harmonizes with the length of the building. If walls are dark, shutters are preferably painted a light color; if light, shutters should be painted dark.

Shutters need not be of the customary slatted type, but can be designed to harmonize with the style of building. Simple panels with a fret-saw opening or vertical boards held together with horizontal battens are inexpensive and can be made in the home workshop. Two

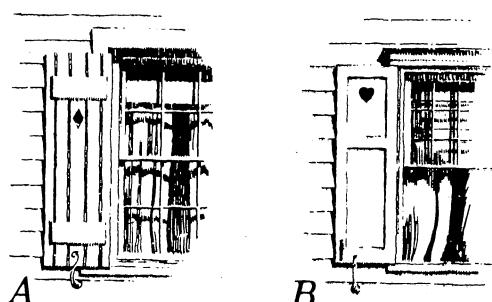


FIGURE 18.—Simple types of shutters: A, Vertical boards held together by horizontal battens; B, simple panels with fret-saw opening.

simple types are shown in figure 18. All shutters should be provided with metal catches to prevent them from swinging in the wind.

PORCHES AND HOODS

Porches should harmonize with the style of the building of which they are a part. Since porches cut off light from adjacent rooms, their



FIGURE 19.—Attractive front and sun porches.



FIGURE 20.—A screened and glassed-in work and dining porch.

location should be carefully planned to avoid darkening otherwise bright and cheery rooms. The porch floor, as a general rule, should be an easy step of not more than $7\frac{1}{2}$ inches below the first-floor level. Figure 19 shows simple types of front porches and a sun porch with a deck, and figure 20 an enclosed rear porch. All except completely enclosed porches should have sufficient slope to the floor to shed water easily, usually 1 inch to 6 feet being sufficient.

In mild climates a back or side porch fitted with screens and glass frames makes an all-year work area for laundry work, churning, the preparation of vegetables for canning, and other household tasks. A washbasin or sink with running water adds to its usefulness. If electric current is available, two or more convenience outlets are generally desirable. Summer meals are usually more enjoyable on a screened porch than indoors.

It is not always possible or desirable to place a porch over every exterior doorway. In such cases, a hood over the door offers weather protection and provides a decorative motive. (See figs. 33, 40, and others.)

COLOR

With the structural work of remodeling completed, there remains the problem of blending new and old construction together by the

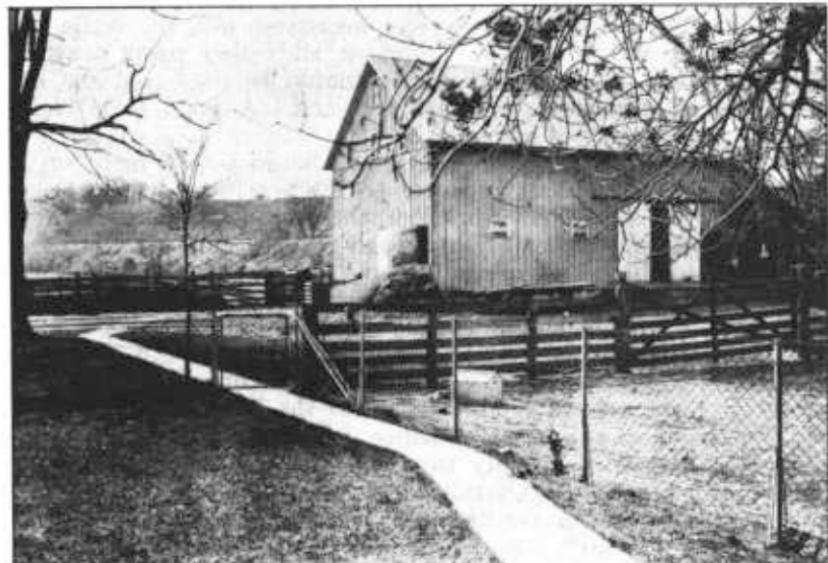


FIGURE 21.—A walk reduces the amount of dirt tracked into the house, and good fences keep poultry out of the dooryard.

use of paint or stain. The latter is somewhat cheaper and more easily maintained; however, if applied to wood of poor quality or wood which is not clear, it may not be satisfactory from the standpoint of appearance because of streaks due to variations in porosity. Dark paints give better coverage and are more easily maintained than light ones. However, nothing takes the place of white paint for the exterior finish of the early American style of farmhouse, especially where trees form a dark background throughout the year. With other styles of farmhouses, and where there is much snow and few trees, warmer colors are often used. Ivory, cream, and soft shades of yellow, brown, or gray are used with good effect. The important consideration in selecting paint is quality. Poor-quality paints are expensive in the long run although the initial cost may be low.⁶

⁶ Suggestions on materials for painting and their application will be found in Farmers' Bulletin 1452, Painting on the Farm.

YARD IMPROVEMENT

Well-placed walks and fences add to the appearance of the farmstead and protect the house, lawn, and shrubbery (fig. 21). Walks are worth many times their cost in reducing the amount of dirt tracked into the house, especially in bad weather. Concrete, brick, or gravel, or sometimes the picturesque stepping stones, can be used.

The appearance of the home is also improved by plantings around it. As a general rule a few trees to provide shade, some flowering shrubs of native growth grouped close to the building to break harsh lines, and a bed or two of flowers selected for their color value will be sufficient decorative relief.

PLANNING THE IMPROVEMENTS

PUTTING THE PLAN ON PAPER

The old house should be accurately measured, and the walls, partitions, doors, windows, stairs, chimneys, and other parts drawn to scale on a plan. Good-quality paper should be used and the lines should be firm and clear, preferably in ink. A good scale is one-fourth inch to the foot of actual size.

Contemplated changes in arrangement should not be made on the plan of the old house. It is better to lay tracing paper or heavy tissue over that plan and work out the new arrangement on the transparent paper. Pieces of cardboard may be cut to scale to represent the furniture and moved around on the plan as an aid in deciding on the best arrangement of partitions, doors, windows, and equipment. Proposed changes can be drawn quickly on the transparent paper and thus be readily compared.

In planning, time should be taken to think out exactly what is wanted, the best way of doing the work, the best materials to employ, and the effect produced by using different materials in various ways. The first plan usually can be improved by further study. A second, third, or fourth alternative is very likely to produce a more desirable result and yet require less change. Since it takes almost as much labor to patch a partition and clear away the debris as to build a new one, no more tearing out than is actually necessary should be considered. For best results, the plan should be checked and put in final shape by an architect or an engineer who has been trained in planning farmhouses.

For a more complete discussion of house plans the reader is referred to Farmers' Bulletin 1738, Farmhouse Plans.

SELECTION OF MATERIALS⁷

Choice of materials for building or improving a house depends largely on the owner's preference, on local availability and price, and on the skill of local builders in using one material or another. The use of lumber from the farm wood lot and of local stone, sand, and gravel, or adobe, all help to reduce the cost of a farm building.

⁷ Several of the associations of manufacturers of building materials have good publications on the use of their products.

The quantities needed should be estimated and the material got ready and hauled at slack times before building is started. Lumber should be cut as nearly as possible to the sizes that will be needed, and stacked under cover to season.

New kinds of materials should be investigated, as improvements are being made in all lines. A new development in low-cost, fire-resistant construction is the use of cinder concrete blocks for walls and precast concrete joists and slabs for floors. For low cost the walls are painted with cement paint, and such walls appear to give good service in moderate climates. Stucco would be a more durable though more expensive outside finish. Lath and plaster or other interior finish on furring strips to form an air space would add to the warmth of the wall. There are many new developments in inside finishes. Among these are new kinds of plasters and new bases on which to apply finishes. The use of composition board, plywood, and insulating materials has been discussed in a preceding section (p. 11). The use of nonabsorbent wainscoting, which are available in a variety of color patterns, should be considered for the bathrooms and kitchens of the better grade of houses.

Building materials usually can be purchased on more favorable terms if the order for the entire bill of goods is placed at one time, after prices have been obtained from two or more reliable dealers and if arrangements are made for prompt payment. Because there is an advantage in quantity purchasing, neighbors may find it worth while to consolidate their orders.

COSTS

Unit costs of foundations, walls, floors, and other major items have been listed below to aid persons in forming a general idea of the cost of work that they contemplate. These costs are for ordinary construction, all materials being purchased at dealers' prices and all labor hired at rates common in farm communities. The range in costs is intended to cover variations in different parts of the country. Where native materials may be obtained at low prices or when much of the work is done by the owner or his family, costs may be much less than those shown.

UNIT COSTS OF BUILDING OR REMODELING

Item	Range of cost
Excavating—usually done by owner.	
Foundations, per linear foot of wall or sill:	
Masonry wall 3 feet high, with sill-----	\$1.25 to \$2.25
Masonry wall 5 feet high, with sill-----	1.75 to 3.25
Masonry wall 7 feet high, with sill-----	2.25 to 4.25
Masonry piers 2 feet high, sills 6 by 8 inches-----	.35 to .55
Masonry piers 4 feet high, sills 6 by 8 inches-----	.45 to .75
Interior floor support, post and girder; per linear foot of girder-----	.25 to .40
Cellar floor, 4-inch concrete, per square foot-----	.12 to .20
Drain for foundation: 4-inch tile, laid, per linear foot-----	.10 to .15
Waterproofing floor and wall, per square foot-----	.10 to .15

UNIT COSTS OF BUILDING OR REMODELING—continued

Item	Range of cost
Exterior walls, per square foot of plain wall surface. For gable ends, add to cost of plain wall per square foot	\$0.10 to \$0.15
Vertical board and batten or horizontal siding with framing; outside painted, interior not finished	.12 to .18
Vertical board and batten or horizontal siding with framing; outside painted, interior sheathed and papered on cheesecloth	.20 to .30
Siding, studs 16 inches on centers; outside painted, interior wainscot and wallboard	.20 to .30
Siding on sheathing, studs 16 inches on centers; outside painted, interior plastered and papered	.30 to .40
Brick 8 inches thick, brick veneer, or brick backed with 4-inch tile, inside plastered and decorated	.40 to .60
Cinder or concrete block, 8 inches thick finished both sides with cement paint	.20 to .30
Cinder or concrete block or hollow tile; outside stuccoed, inside plastered	.30 to .50
For furring and board insulation as plaster base for masonry walls add to above figures per square foot	.08 to .15
Ceilings, per square foot:	
Sheathed, papered on cheesecloth; joists 2 by 6 inches, 2 feet on centers	.10 to .15
Lath and plaster, papered; joists 2 by 6 inches, 16 inches on centers	.12 to .20
Lath and plaster, papered (under second-floor joists)	.08 to .15
Insulating board or wallboard, not painted; joists 2 by 6 inches, 16 inches on centers	.08 to .15
Fill insulation over ceilings { 2-inch fill	.05 to .08
Fill insulation over ceilings { 4-inch fill	.10 to .16
Partitions, per square foot:	
Vertical board, battens both sides, stained; without studs	.08 to .12
Sheathed, both sides papered on cheesecloth; studs 2 by 4 inches, 2 feet on centers	.20 to .30
Lath and plaster, both sides papered; studs 2 by 4 inches, 16 inches on centers	.25 to .35
Wainscot, stained, with wallboard or insulating board above not finished; studs 2 by 4 inches, 16 inches on centers	.15 to .25
Floors, per square foot:	
Softwood; joists 2 by 10 inches, 16 inches on centers, with bridging	.15 to .25
Softwood; joists 2 by 10 inches, 16 inches on centers, with subfloor and bridging	.20 to .35
Hardwood; joists 2 by 10 inches, 16 inches on centers, with subfloor and bridging	.25 to .50
Concrete, 4 inches thick, on fill, troweled surface	.12 to .20
Concrete; precast joists 3 by 8 inches, 2-inch floor slab	.20 to .30
Roofs, per square foot:	
Wood shingle, on slats; rafters 2 by 6 inches, 16 inches on centers	.15 to .22
Asphalt shingle, on sheathing; rafters 2 by 6 inches, 16 inches on centers	.15 to .22
Roll roofing, 2 inches lap, on sheathing, rafters 2 by 6 inches, 16 inches on centers	.12 to .17
Asbestos shingle, hexagonal or Dutch pattern; rafters 2 by 8 inches, 16 inches on centers	.22 to .30
Slate or asbestos shingle, American patterns, on sheathing; rafters 2 by 8 inches, 16 inches on centers	.25 to .40
Steel, galvanized V-crimp, on sheathing; rafters 2 by 6 inches, 16 inches on centers	.15 to .22
Tin, on sheathing; rafters 2 by 6 inches, 16 inches on centers	.20 to .30
Built-up covering, on sheathing; rafters 2 by 8 inches, 16 inches on centers	.15 to .30

UNIT COSTS OF BUILDING OR REMODELING—continued

Item	Range of cost
Roofs, per square foot—Continued.	
Hips and valleys, galvanized-iron flashing, per linear foot of hip or valley-----	\$0.40 to \$0.80
Same, with copper, zinc, or lead flashing-----	.75 to 1.25
Same, flashed with roll roofing-----	.25 to .50
Roof cornice, with gutters and downspout-----	.40 to .80
Porch cornice and girder with gutter and downspout-----	.75 to 1.25
Windows, average size; with frames and trim complete in place, each-----	8.00 to 16.00
Windows, cellar or attic-----	3.00 to 5.00
Window screens, average size, each-----	1.50 to 3.00
Doors, inside, average size; with frames and trim, complete in place, each-----	8.00 to 12.00
Doors, outside, average size; with frames and trim, complete in place, each-----	12.00 to 25.00
Screen doors, average size, each-----	2.00 to 6.00
Stairs, finished, per tread-----	2.50 to 5.00
Stairs, cellar, per tread-----	.50 to 1.00
Kitchen cupboards, length of 8 foot, room height, with doors and drawers; complete in place, each-----	50.00 to 75.00
Kitchen cupboards, open shelf, each-----	18.00 to 25.00
Chimneys; with flue linings, per foot of height-----	2.25 to 3.00
Extra flue, per foot of height-----	.75 to 1.00
Fireplace only, not including base or chimney-----	30.00 to 75.00
Fireplace base, southern conditions, no cellar-----	5.00 to 15.00
Fireplace base in cellar-----	20.00 to 35.00

To use the foregoing tabulation, first find the total amount required of each listed item, then multiply each amount by the corresponding unit cost, and finally add the products. For example:

An addition 20 feet square with piers and sills under three outside walls and one line of piers and sill through the center would have $4 \times 20 = 80$ linear feet of foundation. This length of foundation having piers 2 feet high and sills 6 by 8 inches should cost between $\$0.35 \times 80 = \28 and $\$0.55 \times 80 = \44 , if all material and labor are bought. The lower figure would be used where materials and labor are relatively cheap, and the higher figures where materials and labor are relatively expensive. Miscellaneous expenses will add perhaps 10 percent to the total of the listed items.

Unit costs of building vary considerably in different sections, according to local costs and quality of materials and to wages and efficiency of labor. In general, costs are lower in the central South than in other sections. Costs are usually relatively low near the sources of material and in the open country, and higher where the material must be shipped long distances and near large cities. For these reasons persons contemplating building are advised to obtain estimates from reliable local builders, and to use the unit cost data only for preliminary computations.

Cash costs of farm construction are usually less than estimates based on the foregoing tabulations show, because it is common for the farm owner to do part of the work himself and to make some use of material that is furnished by the farm or is cheaply obtainable in the neighborhood. When this is done the cost will be correspondingly reduced, as may be noted in the reports of estimated and actual expenditures for the houses discussed in this bulletin.

Another method of making an approximate estimate, if the cost of the material required is known, is to add 60 to 100 percent of the materials cost for labor, the percentage depending on local conditions and the type of work and quality of finish required.

FINANCING

Small improvements usually can be made by members of the family without special financing. Many farmers have put in water systems and made other major improvements a step at a time, paying as they went. Payment out of income or savings is recommended whenever possible. Where this cannot be done, a loan as a starter to get the work under way, or to obtain the benefit of a cash price on materials, may be worth many times its cost.

If the farm owner who wishes to make home improvements does not have the necessary money on hand he should first get in touch with his local savings and loan association, bank, or similar institution. Building-material dealers, contractors, and their representatives should also inform themselves regarding the availability of local funds for financing improvements. If no satisfactory arrangements can be made with local lenders three other sources of credit are open to borrowers.

(1) Production credit association loans. Farm-owned production credit associations make loans to farmers who have a sound basis for credit for the alteration, repair, or improvement of farm buildings. Such loans are ordinarily made for a period not exceeding 1 year. If, however, a borrower's repayment record and security are satisfactory, a renewal of the unpaid balance will be considered for an additional period, not to exceed 1 year. No loan will be made for a smaller amount than \$50. The interest rate charged may not be more than 3 percent above the discount rate of the Federal intermediate credit bank at the time the loan is made, the current interest rate (December 1939) is 4½ percent a year. A farmer is required to own voting stock in the association equal to \$5 for every \$100 or fraction of \$100 borrowed. Further information may be obtained from your local production credit association, from the Farm Credit Administration district office, or from the county agent.

(2) Loans insured by the Federal Housing Administration. The Federal Housing Administration does not make loans but insures property improvement loans which banks and other lending agencies make on Federal Housing Administration terms. No security, comakers, or endorsers are required. Amounts up to \$2,500 are available to repair, remodel, redecorate, or install permanent improvements such as lighting, plumbing, and heating systems. Payments may be made monthly or seasonally at market time, over a period up to 3 years. Interest and financing fees cannot exceed a charge equivalent to \$5 a year paid in advance on a \$100 loan. Further information may be obtained from local banks, finance companies, or other qualified lending agencies, or from building-material dealers or county agents.

(3) Federal land bank and Land Bank Commissioner loans. Loans are made by Federal land banks on the security of first mortgages on farms. Commissioner loans may be made on the security of first or second mortgages. Both loans are made on an amortized basis and usually over a long period of years. Therefore, this type of loan is particularly useful when extensive costly improvements are being made which it will take several years to repay. The rate of interest on new loans made by the Federal land banks through national farm loan associations at present (December 1939) is 4 percent. The rate

is 4½ percent on loans made directly by the bank. Commissioner loans bear an interest rate of 5 percent. Information concerning these loans may be obtained from the Federal land bank of your district, from a local national farm loan association, or from the county agent.

METHODS OF DOING THE WORK

Common methods of remodeling farmhouses are: (1) The owner and his family do the work themselves; (2) one or more skilled men are hired; or (3) a contract is let for the entire job, including labor and material. The first method involves the least cash expenditure, but the work is likely to lack the good finish that skilled workmen produce and to require considerable time, prolonging the inconvenience to the family. The second method is very common farm practice, and usually gives satisfactory results. The owner hauls materials, excavates for the cellar or foundation, and helps with other work, thus reducing the expense. (See p. 44.)

Letting a contract for the work has the advantages of quick completion, and of making it possible to know in advance what the cost will be. Securing the services of an experienced contractor will save the owner much time and trouble. After the owners have studied their problems carefully and settled on their plans, bids should be obtained from at least two reliable men. The Federal Housing Administration makes the following recommendations:

You should not pay for the work or sign a note covering the cost of the work without receiving a written guarantee.

The following form is customary and you are advised to require it substantially as given below:

(Guaranteee)

To _____ Date _____ The undersigned hereby certifies that the work which the undersigned contracted to perform for you on the premises located at _____ (Address) _____ (Town)

_____ (County) _____ (State) _____ for a total sum of \$_____ has

been completed in a workmanlike manner. The undersigned further guarantees said work against defects in materials and workmanship for a period of 1 year.

Signed _____

(Contractor)

Contract work should have special advantages in communities where many home improvements are to be made. If neighbors can arrange their building schedules to keep a contractor busy for the entire season, he should be able to make better prices than if his work is scattered and intermittent. This should also justify more use of labor-saving equipment such as concrete mixers, power saws, floor sanders, and portable scaffolding.

EXAMPLES OF REMODELING FARMHOUSES

From records of remodeling obtained by the Farm Housing Survey, 13 jobs dealing with representative types of houses and illustrating good methods of making improvements have been selected for discussion in the following pages. Alternate plans also are presented for most of these houses.⁸ Five examples of remodeling suggested by

⁸ Most of the kitchen arrangements shown in the alternate plans were contributed by Louise Stanley, Chief of the Bureau of Home Economics, who also aided by helpful criticism in planning other features of the houses.

State agricultural colleges are also included, based on real farm situations not covered by the reports of actual construction.

The cash expenditures for remodeling these houses are in every case less than those estimated by using the unit costs given on pages 21 and 22. This is partly because the work was done when prices were lower than those given, but largely because the owners furnished material and labor that did not involve cash outlay, which is typical of farm building. Differences between the estimated costs of the owners' remodeling and those of the alternate plans are due largely to inclusion in the alternate plans of more storage spaces and more modern conveniences than were provided by the owners.

In the plans shown on the following pages original walls and partitions are shown by light double lines while new construction is indicated by heavy black lines.

In many of the plans shown in the following pages, certain space uses and locations of kitchen and other household equipment are indicated by numbers assigned according to the following list:

1. Closet.	12. Cupboard.
2. Coats and wraps.	13. Pass cupboard.
3. Pots.	14. Wheel table.
4. Wood box.	15. Pantry.
5. Stove.	16. Brooms.
6. Refrigerator.	17. Draft cooler.
7. Work table.	18. Sewing closet.
8. Sink.	19. Washing machine.
9. Dish cabinet.	20. Storage.
10. Circulator heater.	21. Folding table.
11. Linen closet.	

HOUSE 1 (SOUTH CAROLINA)

Before remodeling, 1 room; added 2 bedrooms and porch; cash expenditure \$335; estimated full-purchase⁹ cost of work done \$725, of alternate plan \$800.

Even so simple a problem as adding 2 bedrooms to a small 1-room farmhouse calls for careful planning if the best arrangement is to be obtained. Figure 22 shows how 2 bedrooms were added to house 1. The cost was low, and the result has been satisfactory to the owner. However, putting the fireplace and the front door in the left-

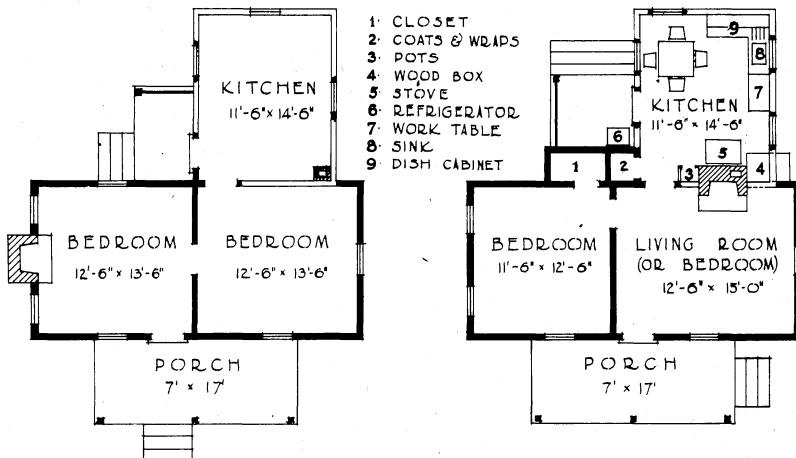
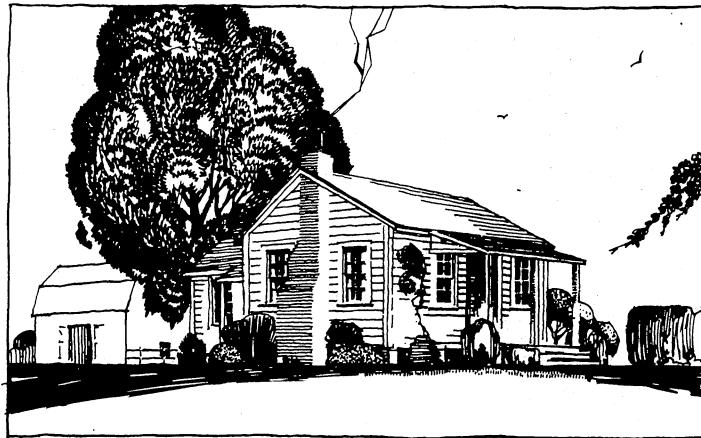


FIGURE 22.—House 1 remodeled and alternate plan.

hand bedroom makes this the living room, and makes it necessary to pass through the right-hand bedroom in going from the living room to the kitchen. Thus neither room has privacy.

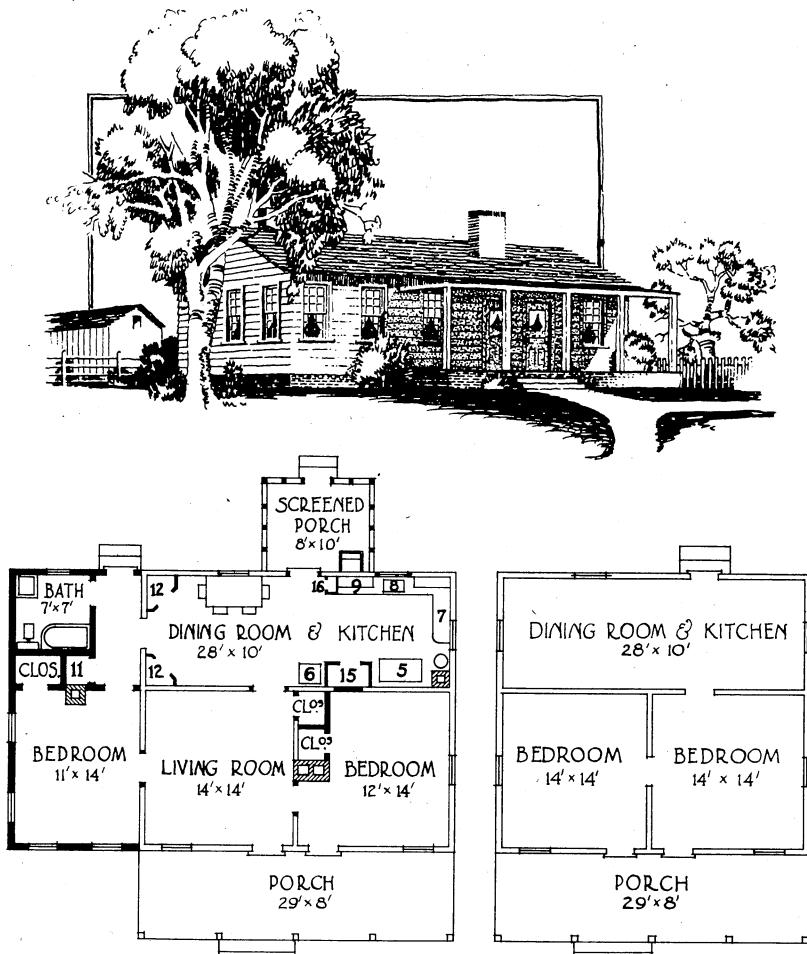
⁹ The estimated full-purchase cost is the estimate of cost based on unit costs as given on pp. 21 to 22, selected within the stated price ranges according to the section in which the house is located.

The alternate plan gives privacy to the left-hand bedroom. It adds two closets, but makes no other increase in either the floor area or the cost of the building. The location of the fireplace is an important factor in this solution. Besides serving the kitchen range with a flue, the fireplace definitely establishes the living room. The latter, being more important as the home center, should be larger than the adjoining bedroom. A wood box, filled from the outside, would serve both stove and fireplace; no other heating is required. The slightly greater cost of the alternate plan provides the two closets, the sink, an extra door, and relocation of one window.

This house also suggests a method of adding one room to a two-room house. If additional rooms are needed later, they might be handled as is shown for house 4.

HOUSE 2 (TEXAS)

Before remodeling, 3 rooms; proposed to add 1 bedroom, bath, and screened porch; estimated full-purchase cost, \$600 to \$900.



REMODELING PLAN

FIGURE 23.—House 2 and plan for remodeling.

ORIGINAL HOUSE

The original house, illustrated in figure 23, is a type common in parts of the South. The plan for remodeling was prepared by the Agricultural and Mechanical College of Texas. The changes would convert a three-room shelter into a comfortable, convenient home, with better light and ventilation than the original house.

The closets, pantry, cupboards, sink, and kitchen cabinets promote order and save effort in the house. Chimneys are provided for stoves in the living room and in both bedrooms. If preferred, a circulator heater burning wood or oil and located in the living room should heat the whole house.

The same remodeling plan might be used for a house with three rooms in a row, like the front part of this house. In that case a shed-roofed addition would be added at the rear for the kitchen and bathroom. One or two additional bedrooms could be added at the bathroom end and corner of this house and made accessible by turning the two closets there into a hallway. (Plan 6525 in Farmers' Bulletin 1738 illustrates such an addition.)

HOUSE 3 (NEBRASKA)

Before remodeling, 4 rooms and porch; added 3 rooms; cash expenditure, \$450; estimated full-purchase cost for work done, \$900; for alternate plan, \$1,425, including \$250 for plumbing and heating.

This house (fig. 24) when first built had only a living room and a bedroom. A first addition comprised a kitchen and two porches, the porch on the front being subsequently enclosed to make a bed-



FIGURE 24.—House 3 in 1934.

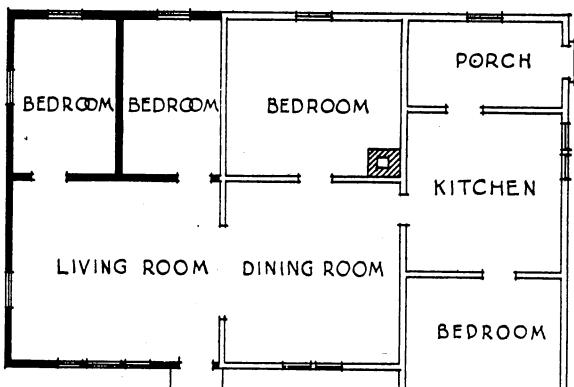
room. The second addition, consisting of the living room and two bedrooms (fig. 25), is the one for which costs are given above.

The 1933 addition measured 16 by 28 feet, and included the installation of gas and electricity. Further improvements desired by the owner include a water system and bathroom. The changes made provide the space needed in the simplest way, but there are no closets and the arrangement of the rooms has some disadvantages. The

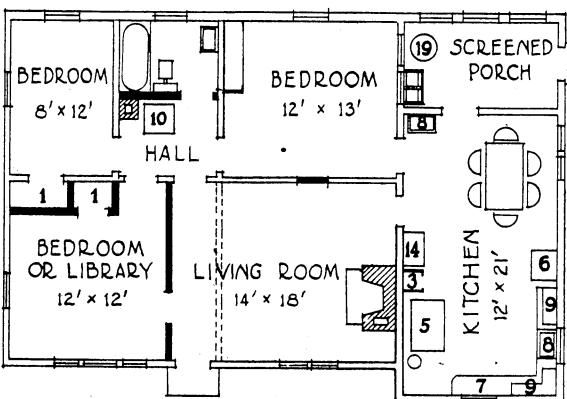
kitchen serves as a hall to all of the rooms, and each of the three rear bedrooms must be entered from the dining or the living room.

The alternate plan converts the center rear bedroom into a bathroom and a small hall to give greater privacy to the bedrooms. The front bedroom and kitchen are made into a combined kitchen-dining room, and moving the chimney takes the stove out of the line of traffic. The original dining room is enlarged and used as the living room, and the other part of the present living room becomes a bedroom or library and closets. Cross ventilation for the bedroom on the right is obtained through high windows onto the screened porch. The living room in the center of the house is convenient to all the other rooms, but is no longer the only path from the kitchen to the bedrooms.

A corner of the enlarged living room, with a ceiling beam carrying the load of the



PRESENT ARRANGEMENT OF HOUSE



ALTERNATE PLAN

FIGURE 25.—Present arrangement of house 3 and alternate plan.

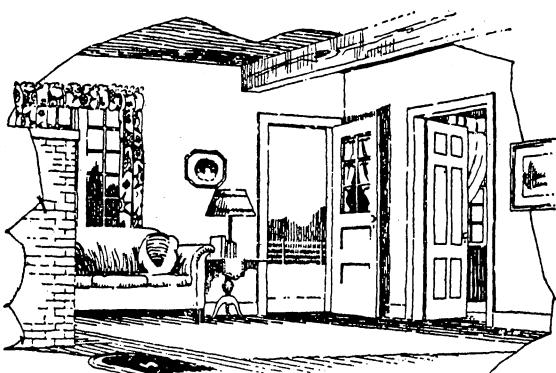


FIGURE 26.—The living room in house 3, alternate plan, viewed from the kitchen door.

original partition, is shown in figure 26. The new part of the house thus would provide two bedrooms, the bathroom, and a small hall, with space for a chimney and circulator heater. In a moderate climate such a heater and the kitchen range should keep the house comfortable.

HOUSE 4 (SOUTH CAROLINA)

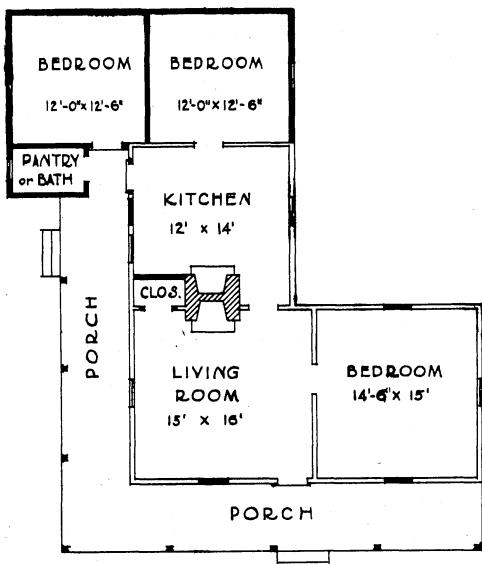
Before remodeling, 3 rooms; added 2 bedrooms and porch; cash expenditure, \$400; estimated full-purchase cost for work done \$825; for alternate plan \$1,325, including \$200 for plumbing and heating.

The owner of this house is much pleased with the improved home (fig. 27), and it would be satisfactory for many households. One of the new bedrooms can easily be heated from the kitchen. Some families, however, would prefer an arrangement whereby the kitchen would not be used so much for a passageway between the living room and the back bedrooms; and to have one bedroom opening only onto the porch might not be satisfactory in cold weather.

The problem of enlarging an L-shaped three-room house is rather common. Another way of adding the same amount of space is shown in figure 28. (A comparable design is shown as the alternate house plan 6513 in Farmers' Bulletin 1738.) This arrangement is simple and keeps the open feeling so desirable in southern homes. The screened back porch would provide a place for men to wash before entering the house, and permit them to go to any part of the house without crossing the kitchen work area. It would provide also a way from the kitchen to the bathroom without passing through the front

bedroom. This porch could be protected by glass in cold weather, or made larger and used as a dining space. The open terrace at the left could be made a covered porch if preferred.

The difference between the estimated full-purchase costs of the owner's remodeling and of the alternate plan includes closets, screened porch, bathroom, plumbing, and a heater in the new hall. This solves the problem of heating the bedrooms and bath. Cutting off one-half of the original kitchen chimney is optional. It is suggested because many chimneys in old homes are in a bad state of repair and need rebuilding to eliminate danger of fire.



OWNER'S REMODELING

FIGURE 27.—Plan of house 4 as remodeled by owner.

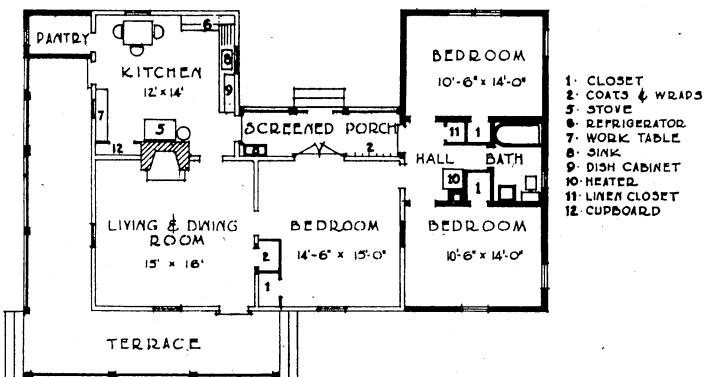
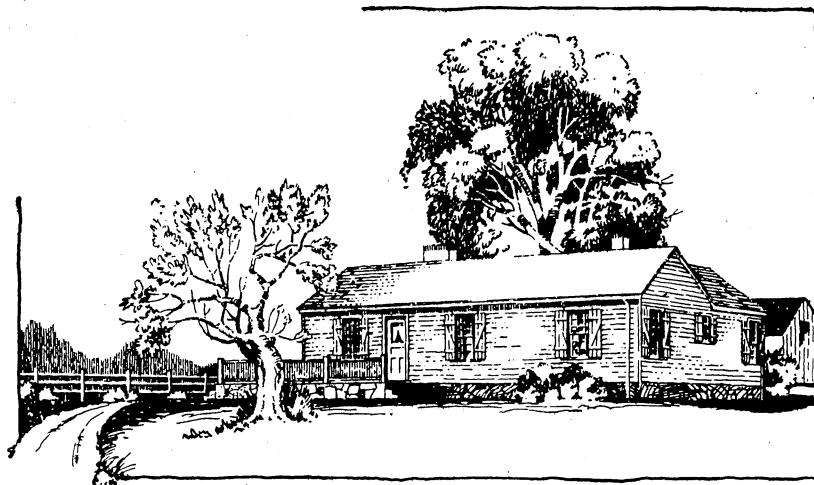


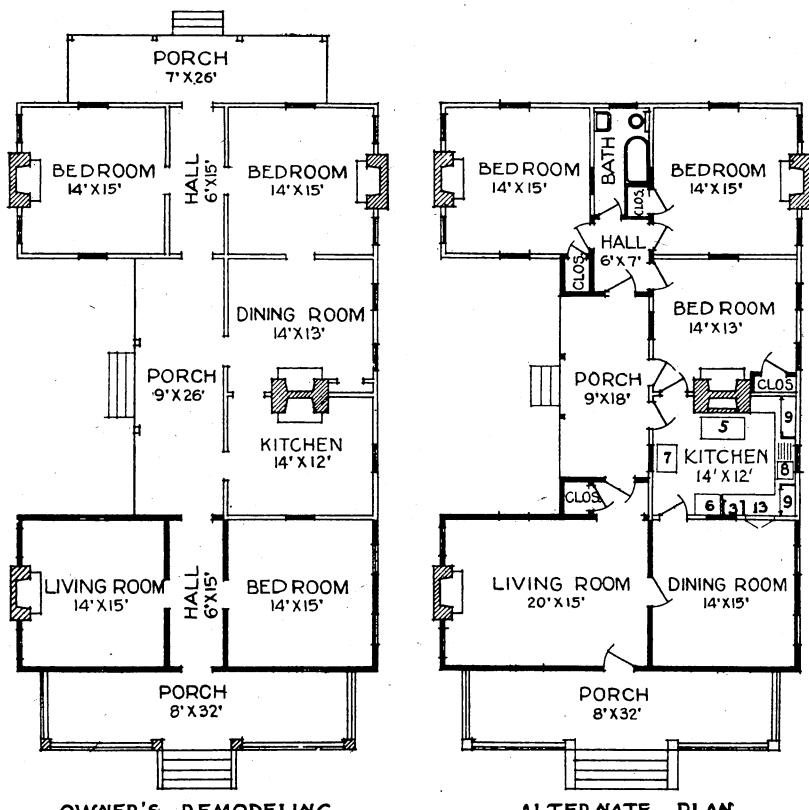
FIGURE 28.—Alternate design for improving house 4.

HOUSE 5 (NORTH CAROLINA)

Before remodeling, 4 rooms; added 2 rooms and porch; cash expenditure \$500; estimated full-purchase cost of work done \$1,150; of alternate plan \$1,500, including \$175 for plumbing.

A feature of this remodeling example was to change the fronting of the house to meet the change in location of the main highway, which originally passed south of the house but when rebuilt and straightened passed on the north. The house owner added a new living room, bedroom, and porch at the north end of his home (fig. 29) to face the highway, retaining the same open effect as the original.

An alternate plan (fig. 29) suggests a larger living room by omitting the hall, and shows how closet space and a bath could be added by closing what is now the rear door and doing away with the porch there. In warm climates, this plan should make a very satisfactory farm home, with the side porch serving as a hallway; in cold climates the probable use of the center bedroom as a hall



OWNER'S REMODELING

ALTERNATE PLAN

FIGURE 29.—Plan of house 5 as remodeled by owner, and alternate plan.



FIGURE 30.—Remodeled house 5 with modernized exterior.

would be a disadvantage. The kitchen opening onto the porch and having windows on both sides should be very comfortable, although the view is partly cut off by the bedrooms. The perspective (fig. 30) shows what the appearance of the remodeled house would be if the exterior were modernized by taking off the heavy eaves.

The simplest way of heating this house is by fireplaces, as indicated. If central heating were desired, a hot-water system with the heater in the living room would be most suitable.

HOUSE 6 (MINNESOTA)

Before remodeling, 4 rooms; added kitchen, 2 bedrooms, sunroom, and screened porch; cash expenditure, \$765; estimated full-purchase cost for work done \$2,100; for alternate plan with part basement \$2,750, including \$475 for plumbing and heating.

A typical square brick house of the North Central States is shown in figure 31 before remodeling. The development shown in figure 32 was made in two stages, the kitchen and basement being the first. A year later the owner's and children's sleeping rooms, closets, sunroom, and porch were added. Other improvements included a bathroom (without fixtures), hall, archway between living room and dining room, oak floors, and interior decoration of the entire house. The additions are of frame construction; brick walls with furring and insulation would have increased the estimated full-purchase cost \$250 to \$300. For completing the modernization, heating and water systems and bathroom fixtures are contemplated. Adequate heating will require a piped-warm-air, a hot-water, or a steam system.

This owner's development is worthy of favorable comment. The kitchen wing is located on the driveway side of the house, the screened porch and sunroom are planned to catch the prevailing breezes, and the two new bedrooms utilize the closets for protection against the winter winds. The location of the stairs to the basement is not entirely satisfactory, because they can be reached only by going through the kitchen and dining room.



FIGURE 31.—House 6 before remodeling.

An alternate design for remodeling such a house is shown in figure 33. The kitchen would include an enclosed entry at grade level, a

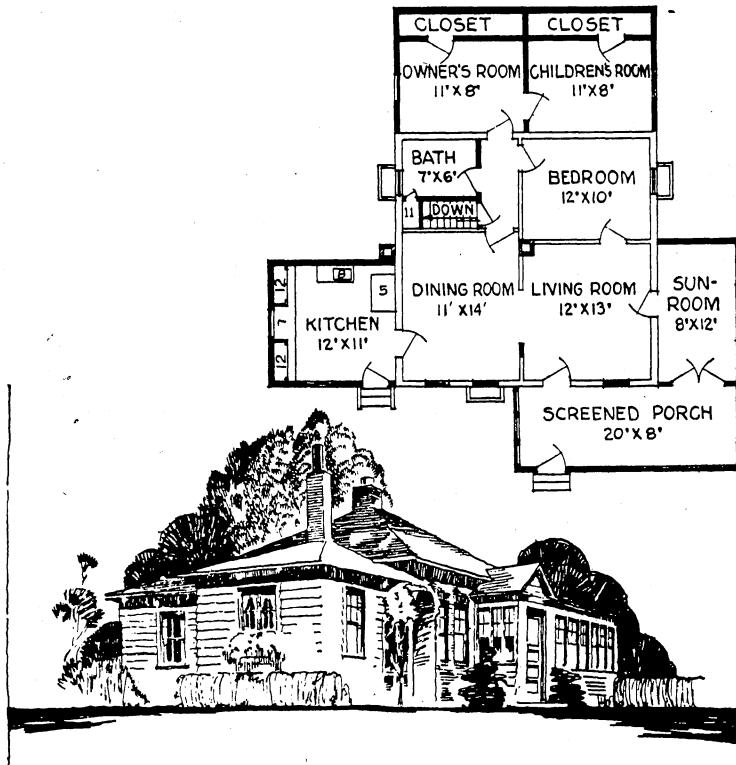


FIGURE 32.—House 6 as remodeled by the owner.

real advantage in regions subject to severe winters. A cellar, if needed only for the heating plant, could be excavated under the new kitchen and only a part of the living room, without disturbing the outside walls. If only the kitchen and entry were added, the house could be heated well by a one-pipe (pipeless) furnace under the middle of the living room, but with the new bedrooms and sun porch also, a piped heating system would give better results. If no cellar were needed, or if ground water interfered with use of a cellar, the rear entry could be enlarged to house the boiler and fuel for a hot-water heating plant. The cost would be a little more than for the cellar and warm-air plant. The simple hood over the front door adds to the appearance of this design.

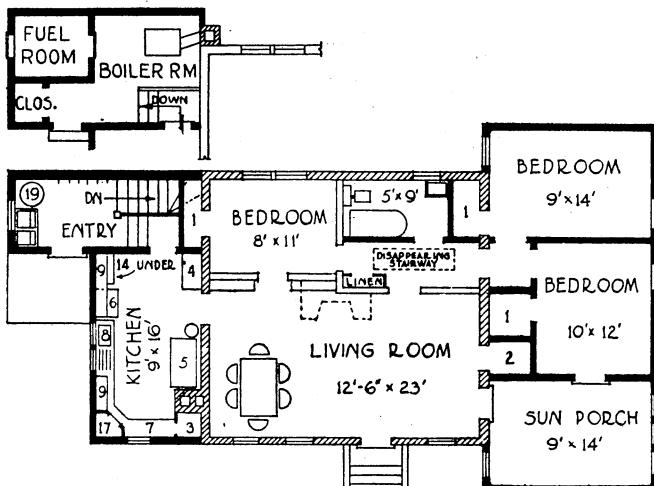
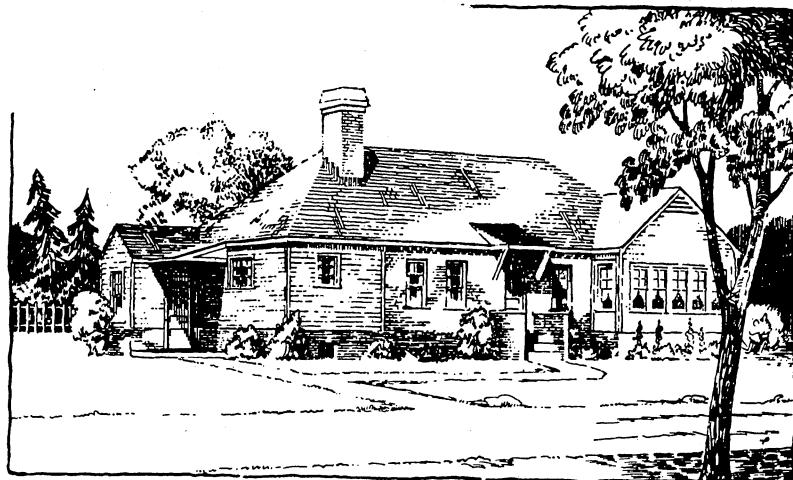


FIGURE 33.—Alternate design for modernizing house 6, and further alternative to place boiler in rear entry.

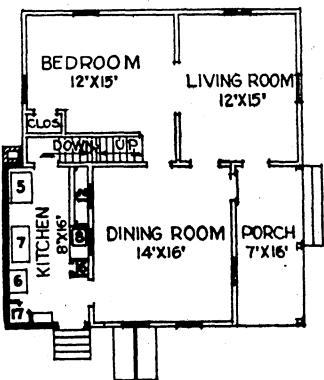
HOUSE 7 (OHIO)

Before remodeling, 6 rooms; added bathroom, kitchen, and heating plant; cash expenditure, \$850; estimated full-purchase cost for work done, \$1,000, including \$425 for plumbing and heating; for alternate plan, \$1,800, including \$575 for heating and plumbing and \$200 for electric wiring and fixtures.

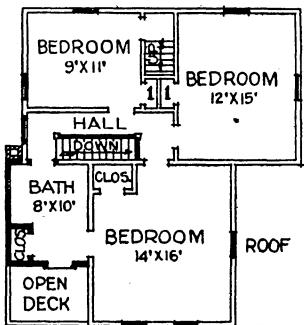
This is a good example of remodeling a T-shaped two-story house consisting of combined kitchen and dining room, living room, and four bedrooms (fig. 34).

The major first-floor change was the conversion of the back porch into a long narrow kitchen, which the lady of the house likes because it saves much walking while doing the kitchen work. There is a pass shelf between the kitchen and dining room to aid in serving meals. As the door to the dining room is near the outside kitchen

door, men coming into the house do not pass through the main part of the kitchen unless they go to the basement, which is fitted up as a laundry, men's washroom, and furnace room. The basement can be entered also through the bulkhead door. The first-floor bedroom is furnished to serve as part of the living room. The owner would have preferred to remove the partition and make one large room out of the



FIRST-FLOOR PLAN



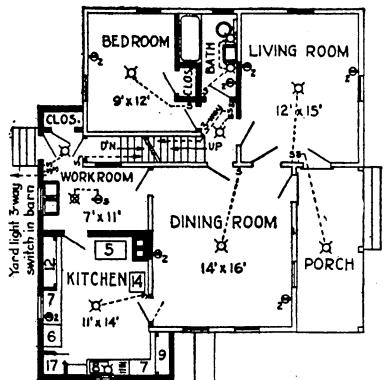
SECOND-FLOOR PLAN

FIGURE 34.—House 7 as remodeled by owner. Inset shows kitchen wing of alternate plan (fig. 35).

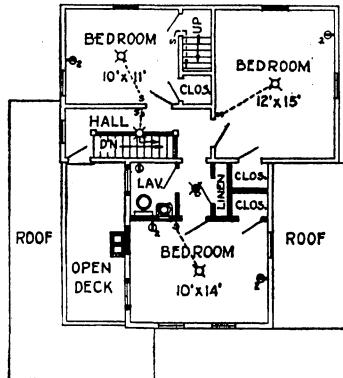
two, but a heating riser in this partition made that scheme impracticable. The second-floor remodeling includes a bathroom and an open deck over the kitchen, both of which have given satisfaction.

This house is a good example of marked improvement obtained at moderate cost. Two features, however, might have been improved by a different design—the arrangement for reaching the inside basement stairway, and the exterior appearance. The alternate plan (fig. 35) shows a kitchen extension larger in plan but only one story high.

(See also inset in fig. 34.) This also provides a washroom and more direct entrance to the basement. The bathroom is shown on the first floor, which is generally considered the best location in a farmhouse. A washroom with toilet on the second floor is shown in the drawing. Good placing for electric fixtures and outlets is shown in figure 35.



FIRST- FLOOR PLAN



SECOND- FLOOR PLAN

ELECTRIC SYMBOLS

- ceiling outlet
- pull chain control
- ▢ drop cord
- ◎ convenience outlet with switch
- ⊖ single convenience outlet
- ⊖⊖ double convenience outlet
- ▢ wall bracket
- S switch
- S3 3-way switch

FIGURE 35.—Alternate plan for modernizing house 7.

HOUSE 8 (KANSAS)

Before remodeling, 4 rooms; proposed (1) adding kitchen, bedroom on the left, porch, and cellar under this addition, (2) installing bathroom and heating plant and remodeling living room, and (3) adding rear bedroom; estimated full-purchase cost for (1) \$1,650; for (2) \$700; for (3) \$450; total \$2,800.

The original house 8 was much like original house 6 but was of frame construction. The illustration (fig. 36) shows the remodeling suggested by the department of architecture of Kansas State Agricultural College. Most of the old structure is used, but the modernized dwelling is a completely changed house with improved exterior, three bedrooms, a centrally located bath, and a large living room. The work can be done in three stages, as indicated above; the dining alcove and entry are part of the first stage, and the second stage includes electric wiring and fixtures in the living room.

In this house communication between rooms is provided by the two halls. This is not uneconomical use of space in this instance because, as the designer pointed out, in remodeling houses existing walls and spaces must be utilized and this often makes it necessary to use more hall space than would be tolerated in a new design.

The new window arrangement in the old section of the house not only improves the exterior appearance but also gives better light to the living room. The design is generous in closet space. The plan of the front entry with wrap closet and dining alcove could be used in providing these features for other houses.

Remodeling as extensive as this would not be undertaken unless the original house were of good-quality material and in good condition. It is a very interesting example of how an old house may be transformed inside and out by a competent architect.

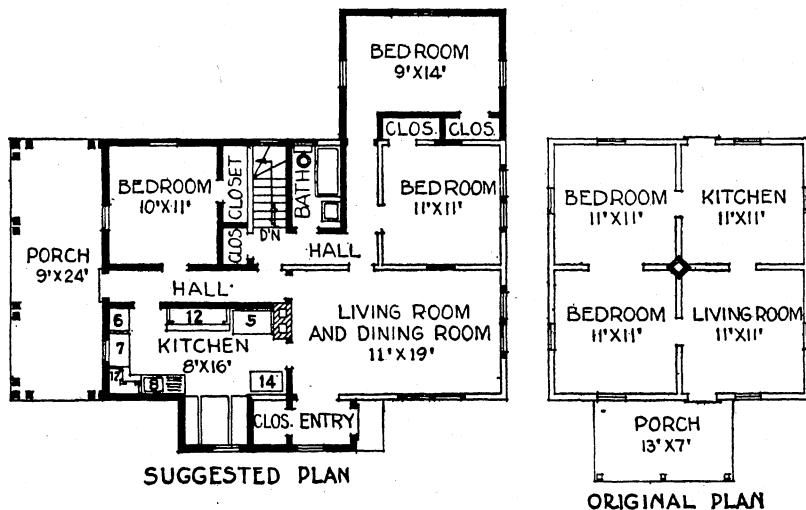


FIGURE 36.—House 8 remodeled and plan of the original house.

HOUSE 9 (CALIFORNIA)

Before remodeling, 5 rooms; removed partitions and added sunroom and entry; cash expenditure, \$281; estimated full purchase cost of work done, \$400; of alternate plan, \$650.

The remodeling of this bungalow (fig. 37) calls attention to some of the disadvantages of this type of house for farm use. The change in the kitchen is most noteworthy, where spaces for work, storage, and everyday meals are now provided. The good-sized entry at the side increases the living area and is especially desirable because the former front entrance was on the far side of the porch from the driveway. The sunroom is utilized as a bedroom for the children and thus provides the third sleeping room which usually is needed in a farm home.

An alternate plan for remodeling this bungalow is shown in figure 38. The bathroom in this plan is arranged to give greater privacy than is obtained in the original house. A two-door bathroom is generally undesirable, as is the arrangement for entering one bedroom through the kitchen and one through the living room. Building out 2½ feet on the side of the house permits the arrangements shown, giving direct access from the living room into both bedrooms and the bath. Only the tub, washbowl, and clothes closets require new locations.

Placing the tub under the window is not ideal, but this layout avoids moving the water closet. A door from the sunroom to the adjoining bedroom would give passage from the former to the bathroom without going through either living room or kitchen.

Another feature of the alternate plan is the kitchen arrangement. In the owner's scheme there are two rear entries side by side and a person must walk the length of the kitchen to reach the living room. The arrangement shown in figure 38 would shift the back porch and kitchen door onto the driveway side of the house, but screen them from the front entrance. The path from the porch door to the living room then would cross only a corner of the kitchen, and would not cause appreciable interference in the work area. The door and

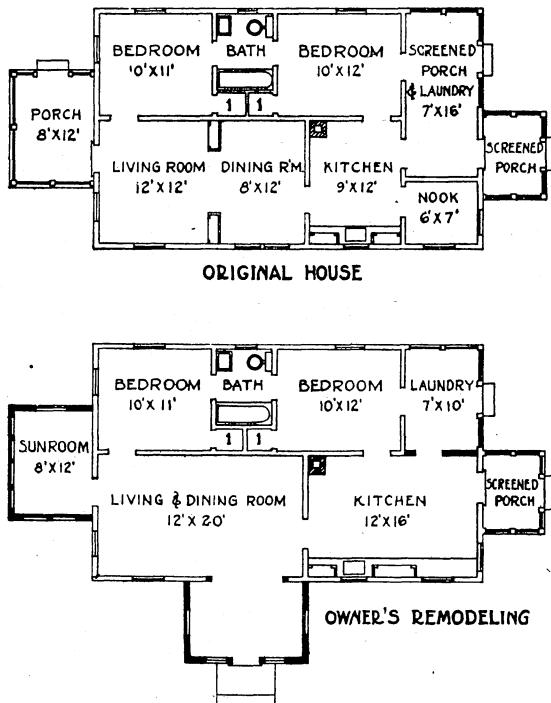


FIGURE 37.—Plan of house 9 before and after remodeling.

window merely exchange places, avoiding the necessity of excessive cutting.

The house could be heated by an oil-burning circulator heater in the living room and an electric heater in the bathroom.

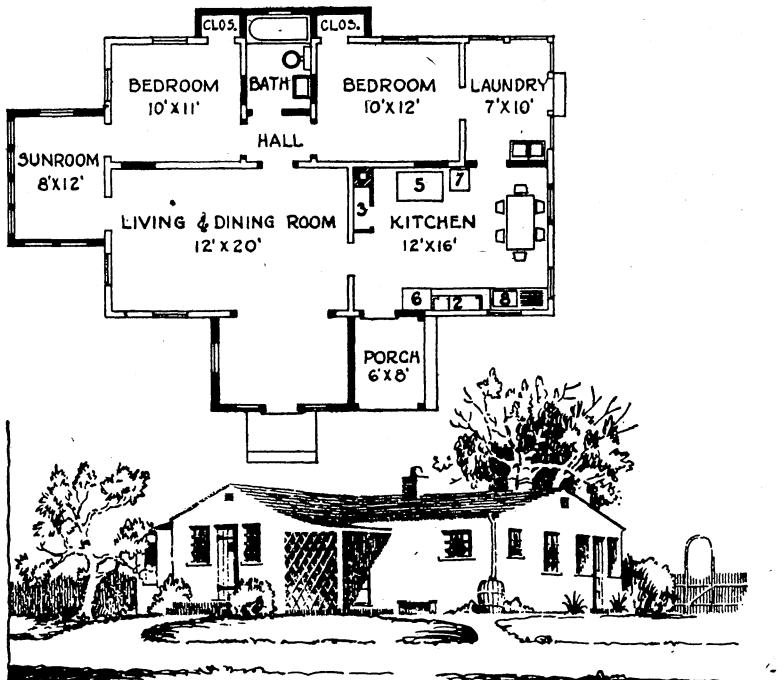


FIGURE 38.—Alternate plan for modernizing house 9.

HOUSE 10 (NEBRASKA)

Before remodeling, 5 rooms; added 2 bedrooms, a bathroom, and a basement; cash expenditure, \$1,650; estimated full purchase cost for work done, \$2,500; for alternate plan, \$3,000.

This original building evidently was a typical four-room square house. An early rear addition comprising workroom and back porch was torn away in 1928 and the lumber used in building a larger addition comprising a new kitchen, two bedrooms, and a modern bathroom (fig. 39). A basement was made under the new part.

This remodeled house illustrates some of the difficulties in planning a compact 1-story house with four bedrooms. The kitchen is not well lighted, because it has windows on only one side, and that is shaded by the porch. The pantry area, with its counters and built-in cupboards, is in the opposite corner of the kitchen from the stove. All travel to and from the bathroom and rear bedrooms, as well as all between the rear entrance and the other rooms, must pass through the kitchen and thus interfere with the housewife's work. The grouping of rooms around the kitchen, of course, aids in heating them from the range; yet a house as large as this could be better heated by a furnace.

A more satisfactory way to add the needed space to a house like this would be to remove the original addition and build a 2-story wing as shown in figure 40. This new wing would provide the kitchen, a utility room or laundry, a bathroom, 2 upstairs bedrooms, and a cellar with space for a central heating plant, thus completing a very livable 4-bedroom house.

The illustration shows how the hip roof of the old building would connect with the new wing. During construction there would be very little interference with living in the old house. In later years the old part could be replaced with a new wing of $1\frac{1}{2}$ stories that would include a

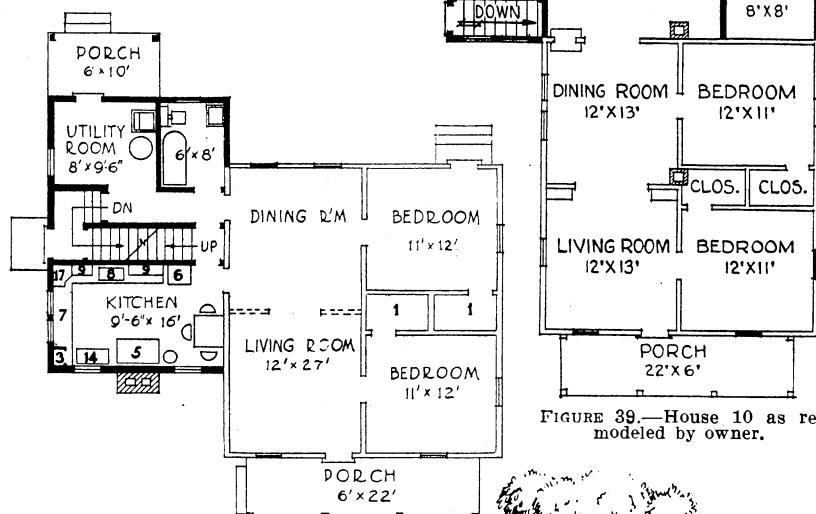


FIGURE 39.—House 10 as remodeled by owner.



FIGURE 40.—Alternate design for modernizing house 10. (Plan for second floor not shown.)

dining room, a large living room, a downstairs bedroom or library, and 2 second-floor bedrooms.

HOUSE 11 (WASHINGTON)

Before remodeling, 3 rooms and bath; added first-floor bedroom, half second story, and basement; cash expenditure, \$1,230; estimated full-purchase cost for work done \$1,850; for alternate plan, \$2,150, including \$150 for one-pipe furnace.

The rather unpromising beginning and the very satisfactory result of a remodeling job in the Northwest are shown in figure 41. A cellar was dug, a downstairs bedroom was added to the kitchen



FIGURE 41.—House 11 (A) before and (B) after remodeling.

wing, and two bedrooms were provided upstairs (fig. 42). The first-floor hall affords convenient passageway between all parts of the house. Adding the fireplace, cutting through two partitions, and

refinishing, comprised practically all the change made in the main part of the original house. The cost of the cellar was \$340.

The owner feels the need of an inside stairway to the basement, more closet space, and a rearrangement of windows to give the house a better exterior appearance. Figure 43 shows an alternate plan for remodeling that would have provided the features desired by the owner while retaining the essentials of the design adopted. By placing the chimney as shown, space is gained in the kitchen, and an additional flue provides for a one-pipe furnace with the register

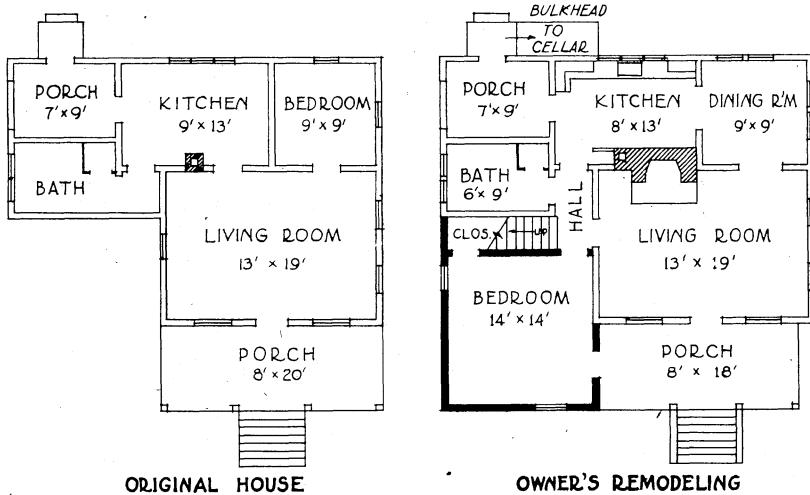


FIGURE 42.—First-floor plan of house 11, before and after remodeling.

at the foot of the stairs. The stairs and closets make the bedroom and living room slightly smaller, but still of comfortable sizes. As an alternate to the owner's arrangement, the partition between the dining room and the living room is shown removed, adding spaciousness to the arrangement and permitting the extension of the dining table into the living room should occasion demand. A wood box to be filled from outside could be built under the linen closet in the bathroom, by raising the closet floor 3 feet and cutting doors through the porch and kitchen walls.

Upstairs, dormer windows should be provided at the back to give cross ventilation to the bedrooms.

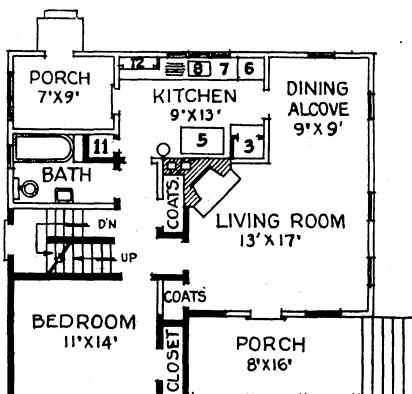


FIGURE 43.—Alternate plan for first floor of house 11.

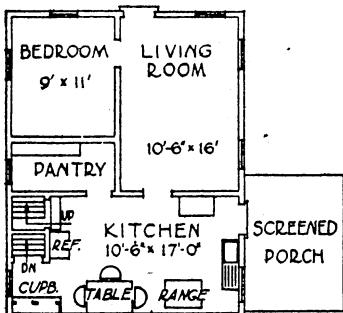
HOUSE 12 (WISCONSIN)

Before remodeling, 6 rooms; added 4 rooms, cellar, garage, stone veneer, and interior finish; cash expenditure, estimated total when completed, \$1,500; estimated full-purchase cost, completed, \$4,000 to \$4,500.

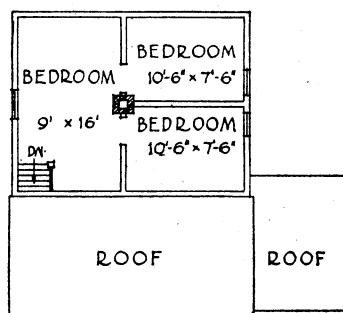
The cover illustration shows the beginning and the near-completion of modernizing a pioneer farmhouse in central Wisconsin. The work is being done by a young dairy farmer and his wife, with a cash outlay very small for the result obtained but a large use of farm and local materials and of their own labor.

The original house was built in 1854 of native timber, by the great-grandfather of the present owner, who moved onto the farm in 1932. A kitchen used as a main thoroughfare, steep stairways, uncomfortable second-floor bedrooms, and difficult heating were among the inconveniences of the old home (fig. 44). As is all too common on farms, the dwelling had been slighted while all the other buildings had been kept painted and in good repairs. Water had been piped to the barn but not to the house.

The young farmer and his wife wanted a modern home, one considerably better than their cash savings would pay for but toward which they were willing and able to give much in labor and thought. He felled oak timber on the farm, and hired a portable sawmill to cut the logs into planks and boards which were allowed to season properly. With help from the State agricultural college and a Farm Housing Survey architect, the two young people drew up the plans for the new—or renewed—home. Four new rooms and a cellar under the whole house were added, and the old portion was rearranged and refinished (fig. 45). To put the garage in the cellar, and not too deep for drainage, the old house was raised before the new part was built. The exterior veneer is native stone procured by razing an abandoned house nearby.



• FIRST-FLOOR PLAN •



• SECOND-FLOOR PLAN •

FIGURE 44.—House 12 in 1933, before it was remodeled. (See cover illustration.)

The new kitchen, finished in native hardwood, is a model of compactness and convenience (fig. 46)—a place where housework may easily become a pleasure instead of drudgery. It is situated in the corner of the house nearest the barn.

The new living room (fig. 47) with its stone fireplace, its hardwood floors, and the walls paneled in cherry cut on the farm some years before, is a secure and comfortable place to enjoy a quiet evening or a visit with friends.

The new stairway and the bathroom convenient to both upstairs and downstairs are also major features in the achievement of this now very comfortable home.

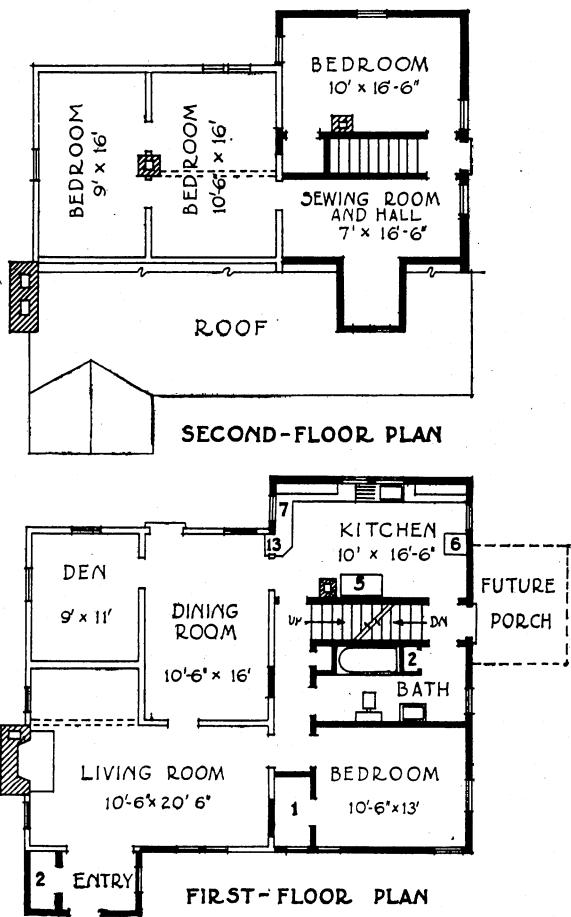


FIGURE 45.—House 12 in 1935, with remodeling completed to stage shown in cover illustration.



A



B

FIGURE 46.—A, The old kitchen of house 12, inconveniently arranged and inadequately equipped; B, the new kitchen, with modern sink, ample work space, and many cabinets.

This house illustrates how attic space under a low roof may be utilized for comfortable bedrooms. In the old house the upstairs rooms were very cold in winter and very warm in summer. In

remodeling, insulation was used under the roof and on the gable walls to give greater protection from heat and cold. This and the installation of a furnace made the house much more comfortable during its first winter. The insulation and the better ventilation to be obtained by the additional windows should make the upstairs more livable in summer.

The entire work of modernizing this house is being done by the owners and one skilled builder, with occasional extra help.

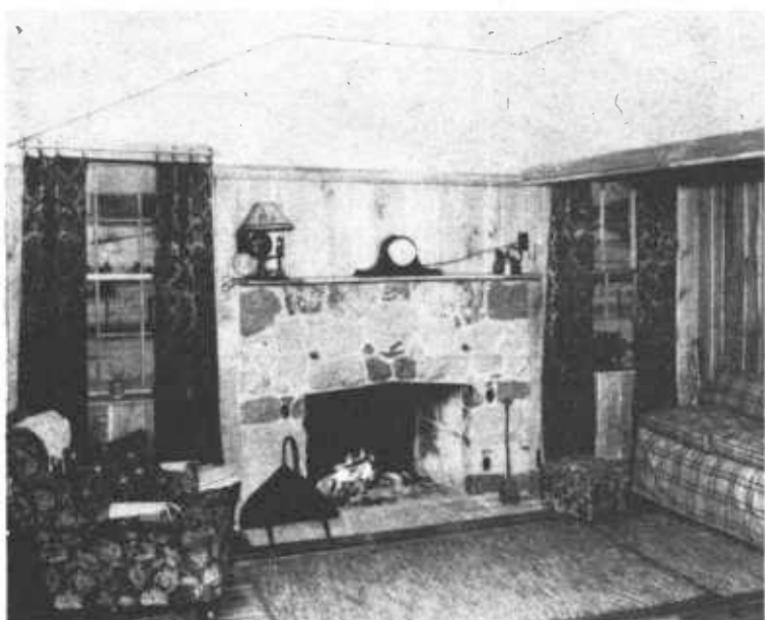


FIGURE 47.—A cheerful corner of the new living room in house 12.

HOUSE 13 (OHIO)

Before remodeling, 6 rooms; suggested adding a bathroom, laundry, and closets; estimated full-purchase cost for suggested plan \$900 or for alternate plan \$950, including \$450 for plumbing and heating.

Another design for remodeling a two-story T-shaped house has been proposed by the department of agricultural engineering of Ohio State University. The original house (fig. 48) has plenty of sleeping space in the four bedrooms, but it has no closets or bathroom and the living room is rather small.

The suggested remodeling proposes an addition adjoining the kitchen (fig. 49) to provide a laundry or workroom at the kitchen level and a bathroom three steps higher, off the stair landing. There the bathroom is convenient to both upstairs and downstairs rooms. A doorway and a flight of three steps from the stair landing to the downstairs bedroom shortens the travel from that room to the kitchen or the rear entry.

With the kitchen arranged as shown, the work is done in the corner away from the doors, so men or children going through will

interfere little with the preparation of meals. There is room in the kitchen for a small dining table for everyday meals, and company dinners can be served in the living room. The alternate plan (fig. 49) is even more compact and would keep traffic almost entirely out of the work area, at the cost of a slight reduction in working space.

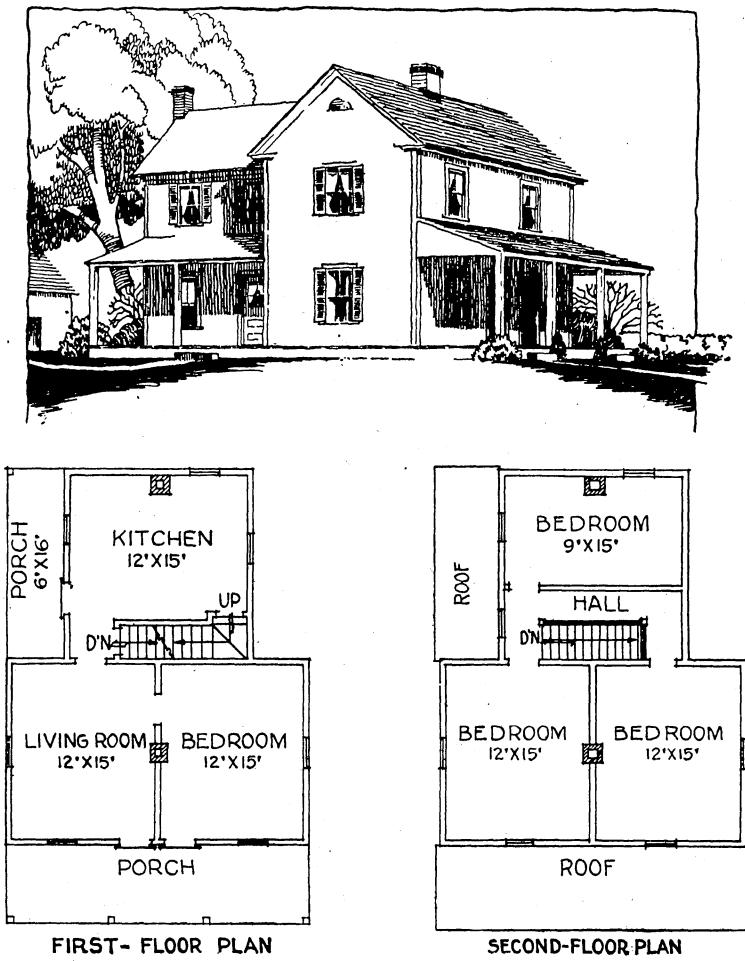


FIGURE 48.—House 13, as used in 1934.

The downstairs bedroom would be used somewhat according to the size and habits of the household. It might be furnished and used as part of the living room if the upstairs bedrooms provided sufficient sleeping space. In this case double or French doors between these rooms might be desirable; or the two rooms might be made into one large living-dining room by removing the chimney and at the end of the bedroom building a fireplace with flue for the furnace. If, on the other hand, the downstairs bedroom were wanted regularly for sleeping, greater privacy could be obtained and a closet secured by making a small hall from the living room to the stairway as shown in the alternate plan.

The second-floor alterations suggested consist only of building 4 closets, 1 in a corner of each bedroom and 1 opening off the hall. To use wardrobes, instead, would be a little cheaper.

A piped warm-air, hot-water, or steam heating system would be most satisfactory for the house remodeled as shown in the suggested plan, although for the alternate plan a one-pipe furnace with the register in the hall probably would serve.

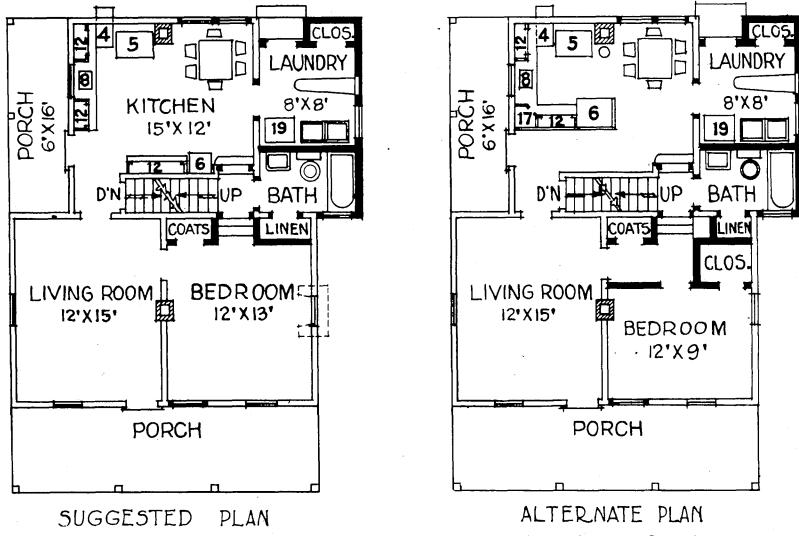


FIGURE 49.—First-floor plans for modernizing house 13.

HOUSE 14 (NORTH CAROLINA)

Before remodeling, 5 rooms; added sunroom, bathroom, dressing room, electricity, and new partitions; cash expenditure for carpentry and materials \$1,600, plumbing \$200, for water and sewerage systems \$250, for electric house wiring and fixtures \$150, for extending power line \$650.

A graphic story of restoration in a setting strongly reminiscent of ante-bellum days is told by the accompanying illustrations. The old house seemed to express a note of sadness, due to years of neglect (fig. 50 A). The interior had few partitions, and in most of the building the studding was exposed. Beneath all this discouraging appearance, however, there existed a dignity and charm that offered a rich reward to the owner who should restore the building. The house is especially interesting because it is of a type found widely distributed through the South.

The improvements made by the owner are shown in figure 51. An addition at the rear of the two-story wing provided a bathroom, dressing room, and closet on the first floor, and a sunroom above with storage space. New partitions upstairs and downstairs divided the house into rooms of convenient size, and provided closets for all bedrooms and the sewing room. A kitchen pantry was built on the rear porch, the remainder of which then was screened. The stairway was rebuilt. The front porch adds to the livability of the house.

The original house is a nicely proportioned example of colonial architecture, and some persons would feel that the shed-roofed, two-story addition somewhat mars the exterior appearance unless hidden by trees. A simple scheme for remodeling this house while maintaining the original style is shown in figure 52. The bathroom addition but one story in height would not detract from the appearance



FIGURE 50.—House 14 (A) before and (B) after remodeling.

of the two-story wing. The second-floor doorway over the front porch suggests that the porch be roofed with a flat deck guarded by a railing, instead of having a pitched roof as pictured in figure 50, B, in order to give sun space that in large degree would compensate for the omission of the sunroom shown in figure 51. The present remodeling is very good, and the house will be even more attractive when the grading and planting around it are completed, but the alternate plan would be more in harmony with the original colonial style. The closet problem is solved in a simple way that

spells economy in construction. Storage space can be obtained in the attic by the use of a trap door or a disappearing stairway.

The stairs run up toward the back of the house. They would be more convenient if reversed to run up toward the front, but that cannot well be done because the hall is too short to give clearance over the front door unless the stairs were made undesirably steep

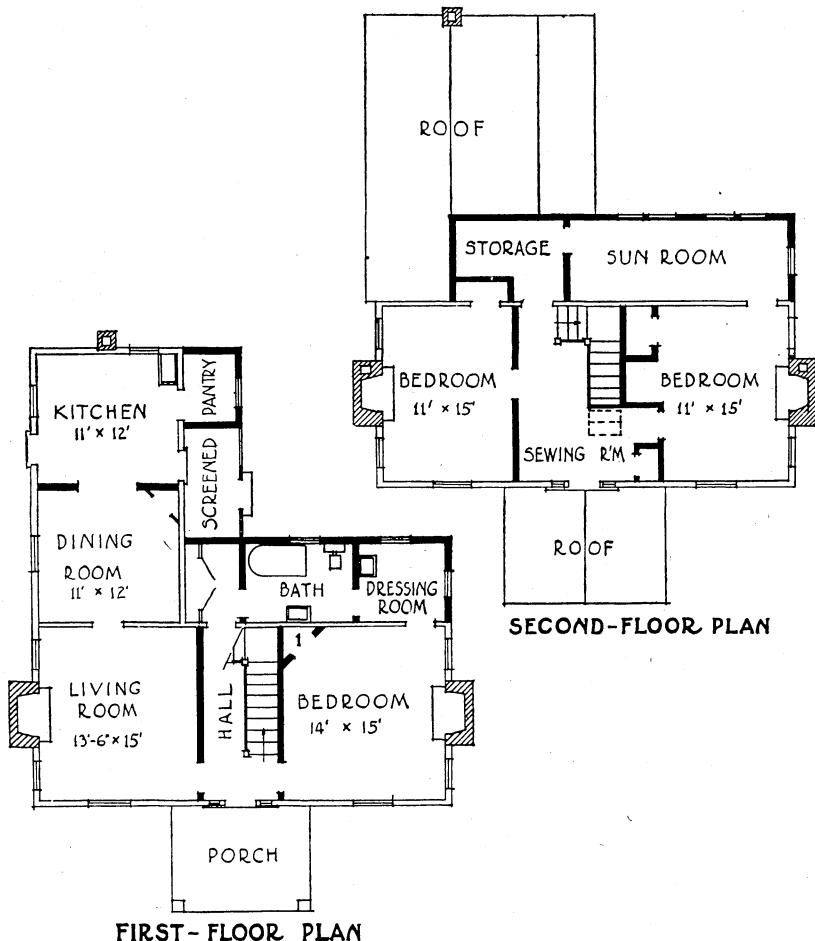
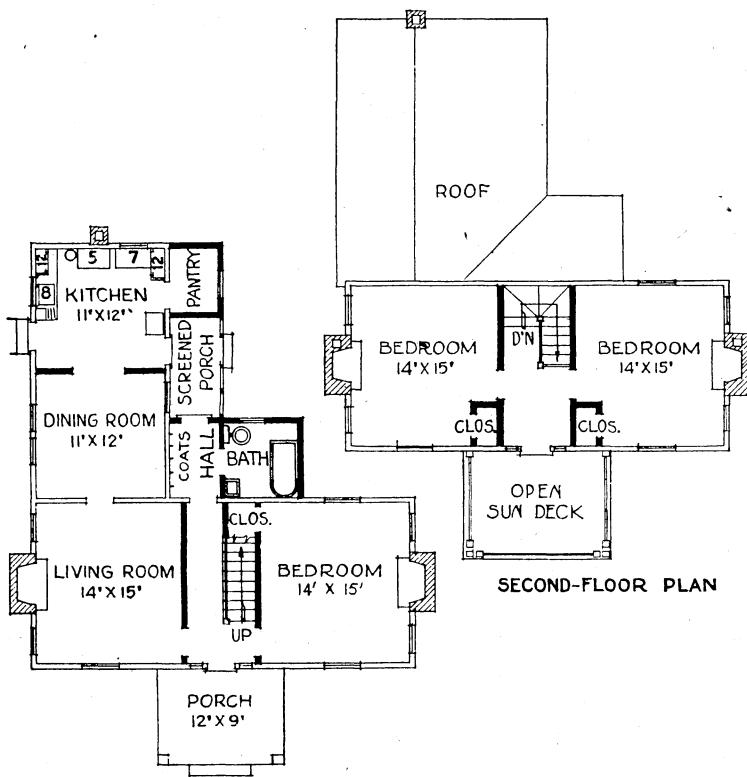


FIGURE 51.—Plan of house 14 as remodeled by the owner.

or winding. While the house is heated by fireplaces only, the wall between living room and stairway hall is needed to keep the living room comfortable in cold weather; if a central heating plant were installed, the omission of this wall would improve the proportions of the room.

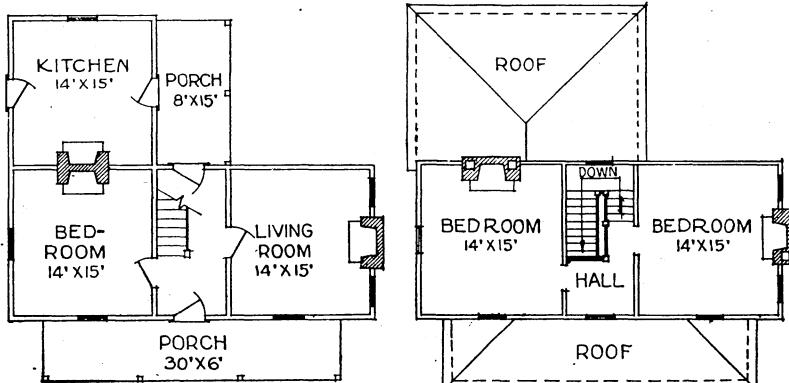


FIRST-FLOOR PLAN

FIGURE 52.—Alternate plan for remodeling house 14.

HOUSE 15 (NORTH CAROLINA)

Before remodeling, 5 rooms; added 4 rooms, bath, and porches, changed stairs and altered roof; cash expenditure, \$1,000; estimated full-purchase cost, \$3,500 to \$4,500.



FIRST-FLOOR PLAN

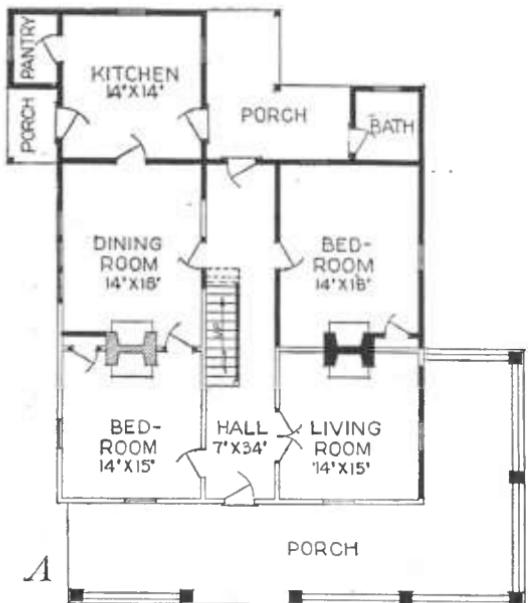
FIGURE 53.—House 15 before remodeling.

A family of 10 in only 5 rooms made this house (fig. 53) badly crowded. Before remodeling it was much like house 14, and it could have been changed into a 3-bedroom dwelling in much the same way. To obtain 6 bedrooms for the family, the owner followed the simple expedient of filling out the ell to form a square 2-story house and added a 1-story kitchen wing. The old roof line was altered and a new porch added to give the house a modern, pleasing

appearance (fig. 54).

The two central chimneys are placed to heat every room except the kitchen. Much of the lumber was cut from timber on the place and sawed by the owner's mill.

The room arrangement of the first floor is planned in simple, direct style, without complicated partitions. A square building like this is economical in construction as well as in upkeep. Some people would favor placing the living room beside the dining room and the two bedrooms next to each other, with the bath in a more central location.



A



B

FIGURE 54.—House 15 as remodeled by owner (second-floor plan not shown); A, Plan of first floor; B, front view.

An alternate plan is shown in figure 55. In this the stairway is moved back and the left front room and the hall are thrown together to form a large living room. The front room at the right is made a bedroom, and a bedroom and bathroom fill out the ell. This change in the stairs would cost little if any more than that made by the owner, and the changed location of the bathroom would be more convenient to all bedrooms. In a house of this size, however, two bathrooms are desirable, or a bathroom on one floor and a toilet on the other. This has been easily done by merely carrying up the partitions of the first floor.

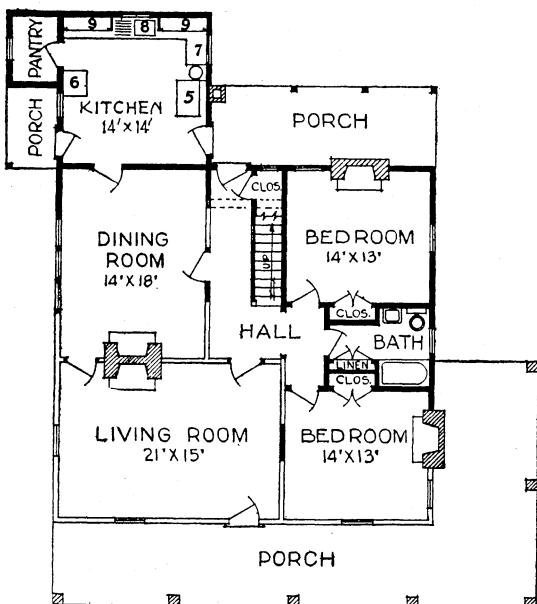
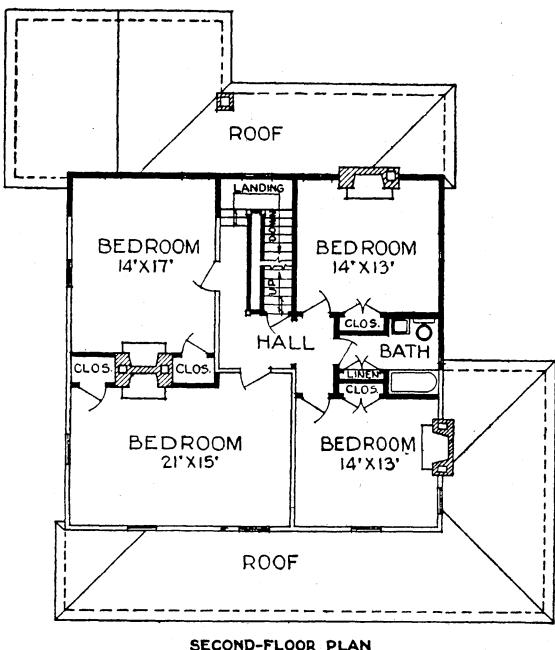


FIGURE 55.—Alternate plan for modernizing house 15.

The large rooms of this house are suited to a southern climate, where winter heating is less difficult and shelter from the summer warmth is more important than in the North. Fireplaces are provided in all bedrooms. A central hot-water heating system could be installed, with the heater placed beside the dining-room fireplace, and the new chimney in the rear bedroom omitted. This would add much to the comfort of heating the house in cold weather, and the cost would be partly offset by the saving in chimney construction and maintenance.

A kitchen arrangement particularly suited for using an electric or gas stove is shown in figure 56. This avoids the uncomfortable warmth from a wood range, is more compact, and brings the working area closer to the dining table.

HOUSE 16 (ILLINOIS)

Before remodeling, 7 rooms; suggested replacing 1-story wing with 1½ story addition containing 4 rooms, bath, and toilet; estimated full-purchase cost \$3,000 to \$4,000, including heating, plumbing, and electric wiring for entire house.

This was originally a 4-room, 2-story house with a 1-story kitchen wing, to which various additions have been made to obtain the house shown in figure 57.

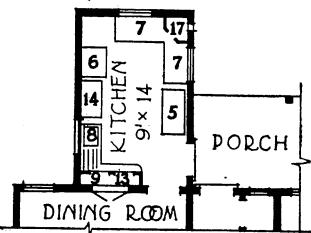


FIGURE 56.—Alternate kitchen arrangement for house 15, with electric stove.

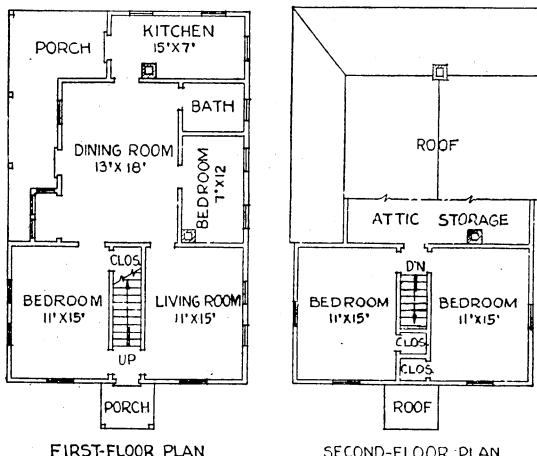
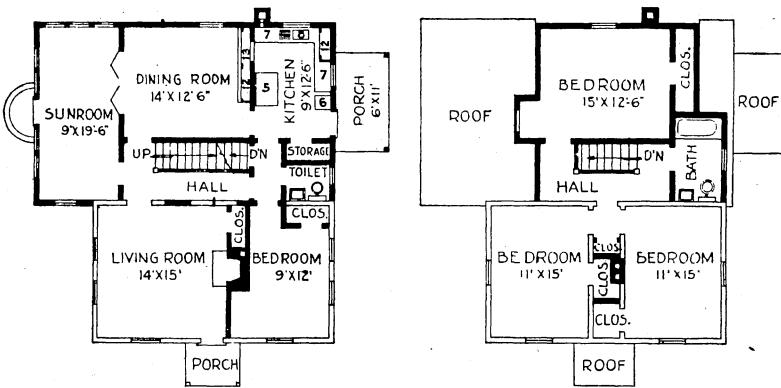


FIGURE 57.—House 16 in 1934.

In remodeling a building of this kind it is a question whether to tear away completely the 1-story wing or to use parts of the old walls and floors. The decision should depend largely on the condition and arrangement of the old house and on the new facilities desired. It is generally easier to plan new than to try to utilize existing walls and spaces.

In the plan for remodeling this house (fig. 58) suggested by the University of Illinois, the entire 1-story part would be removed, which would permit easier excavation of the cellar, and the material would be salvaged for use in rebuilding. The stairs would be removed, and the space gained downstairs made part of the living room, while that gained upstairs would be used for closets.

The suggested arrangement has several good features. Men or children coming in at the kitchen door have easy access to the dining room, living room, stairs, or toilet without passing through the



FIRST-FLOOR PLAN

SECOND-FLOOR PLAN

FIGURE 58.—Suggested plan for remodeling house 16.

kitchen work area. The kitchen, though small, is well arranged and convenient. The outside chimney could be eliminated if an electric, gas, or oil stove were used. There are wide doors at the end of the dining room, so that the dining table can be extended onto the sun porch when many guests or threshers are to be fed. The three upstairs bedrooms are all of good size, have closets and cross ventilation, and are convenient to the bathroom. The downstairs bedroom also is a very usable room, but if the upstairs bedrooms are sufficient this space could be added to the living room and the fireplace located at one end. The house can be heated by a one-pipe furnace with the radiator in the hall which connects with all the rooms, but a piped warm-air, hot-water, or steam-heating system would give more even distribution of temperature. The remodeled house might appear as in figure 59.

The relation of the rooms of a house like this to the points of the compass and to the highway and driveway should be studied with especial care on account of the sun room. This plan could easily have been reversed, to place the living room and sun room on the right instead of on the left side. The house as shown in figure 58 fits well in locations on the west side of the highway, while the reversed plan fits better in locations on the east side of the highway (fig. 60).

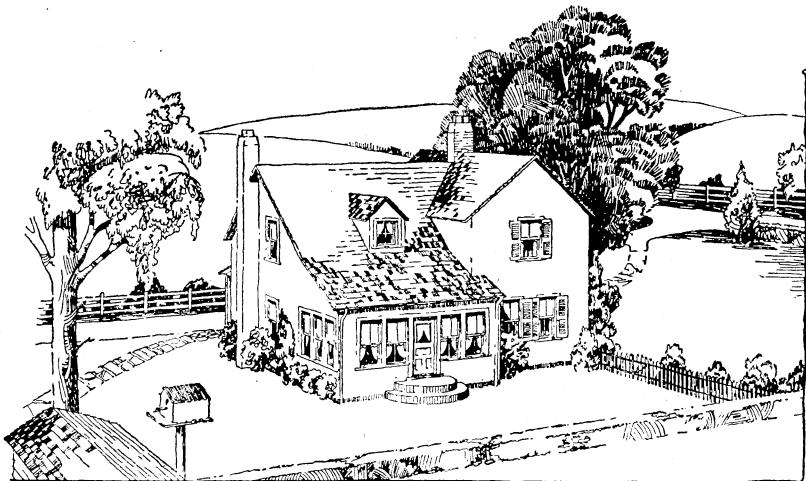


FIGURE 59.—Sun room view of house 16, according to suggested remodeling plan.

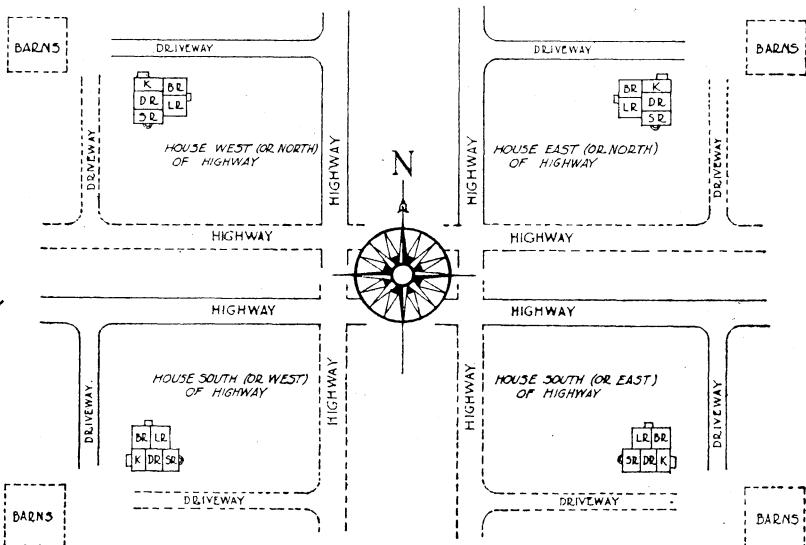


FIGURE 60.—Variations in the placement of house 16 according to location with respect to highway.

HOUSE 17 (MASSACHUSETTS)¹⁰

Before remodeling, 8 rooms; suggested rearrangement of interior and installation of equipment; estimated full-purchase cost \$1,600 to \$2,000, one-half for heating, plumbing, and electric wiring.

Eighteenth-century houses in New England were heated by means of open fireplaces, and cooking was done over an open fire and in ovens built into one or both sides of the huge kitchen chimney. For this reason the houses were built around chimneys large enough to allow for fireplaces in nearly every room (fig. 61). This type of

¹⁰ This example of remodeling is furnished by the department of agricultural engineering, Massachusetts State College.

house is common in the Connecticut River Valley and elsewhere in the Northeastern States.

In these central-chimney houses the stairway is almost invariably found directly in front of the chimney, in the front entrance hall. If the second story was divided into rooms, those in the rear of the house could be reached only by going through one of the front rooms, except where rear stairs leading from a rear first-story room were built, as was frequently done.

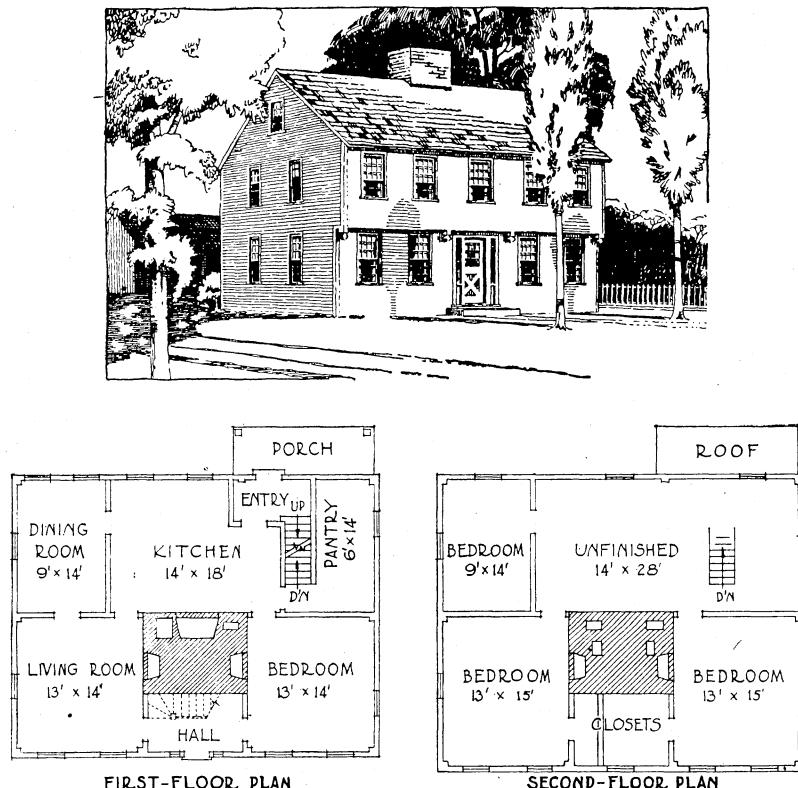


FIGURE 61.—House 17, of central-chimney type common in New England.

The structure also of these houses is distinctive. With the tradition of Old England's method of framing wood houses behind them, the earlier builders rarely did other than to hew the main frame from oak, mortising and tenoning all joints and securely bracing all main timber intersections in both horizontal and vertical planes. The weight of the house is carried on this frame, and because the partitions bear no load they can be rearranged more easily than in other types of houses.

The farmhouse shown in figure 61 is typical of the central-chimney type, except for the omission of the front stairs. A front stairway

may have been built in the original house, and subsequently removed, but the lay-out seems to indicate that the builder wished to avoid the inconvenience caused by a front stairway and provided only that from the rear entry. With one large unfinished room in the second story, presumably unused for sleeping, this made for better air circulation upstairs notwithstanding the rear entry approach. The house as it now stands shows the effect of changes in methods of heating and cooking. As is commonly found, stoves have replaced fireplaces which, when no longer needed, have been bricked up.

The plans for remodeling (fig. 62) shows how the interior could be changed to provide modern conveniences and comforts for a typical New England farm household. A more convenient stairway is suggested, permitting the finishing of four bedrooms and a bathroom upstairs, with no room serving as a hallway to another. The kitchen would be moved to the corner, where it would have light on two sides; the living room would be enlarged; the dining room

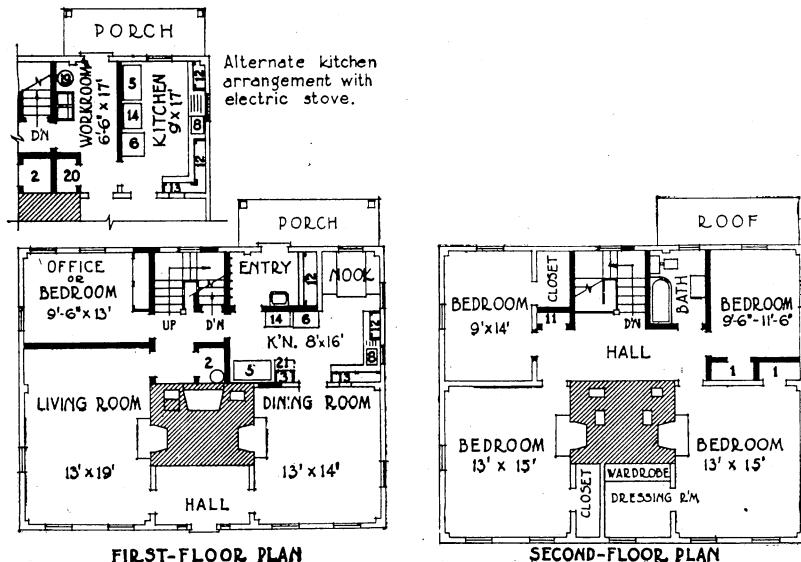


FIGURE 62.—Suggested remodeling for house 17.

and downstairs bedroom would exchange places. A small entry beside the kitchen would provide a place for men to hang clothes and wash before coming into the main part of the house. Where cheap electric current is available, the kitchen and workroom could be made even more convenient by adopting the alternate arrangement shown in figure 62.

With a new central heating plant installed in the basement, some of the fireplaces could be reopened, the mantels cleaned and refinished, and much of the spirit and atmosphere of a past age recaptured and enjoyed amid the conveniences of modern times.

HOUSE 18 (MICHIGAN)¹¹

Before remodeling, 11 rooms; installed stairway, bathroom, and fireplace and added screened porch.

House 18 (fig. 63) has been in satisfactory use by two farm families for several years, the owner and his son having separate apartments in it. Each family has a kitchen, dining room, and living room on the first floor, and bedrooms on the second floor. There is communication between the two apartments only through the basement.

The remodeling has been a rather gradual process. Porches were screened, a laundry room was added, a bay window was built on, and a bathroom was installed. As it happened, the house developed in such a way that when the two-family arrangement became desirable the structural changes needed were only minor.

The alterations made to complete the separate apartments are shown by the plans (figs. 64 and 65). The music-room wing was



FIGURE 63.—House 18, which has separate apartments for two farm families.

shut off by closing three doorways; a partition was moved so the new stairs could be built; and the upstairs hall and bathroom were taken from one of the bedrooms. Outside and inside stairways were built to the basement, where laundry equipment was installed; a screened back porch gives a comfortable working space in summer and protection to the kitchen doorway in winter; the fireplace adds cheer to the new living room. Each apartment has its own one-pipe furnace. These changes were made over a period of 6 or 7 years.

The changes made in this house have provided economical but adequate housing for both families, with satisfactory privacy for each family, including independent control of its own heating plant. The front porch and the basement are the only parts of the house used in common. Instead of money being put into a new structure, it was put into improvements and conveniences that have made the old home a very pleasant and comfortable place in which to live.

¹¹ Information furnished by department of agricultural engineering, Michigan State College.

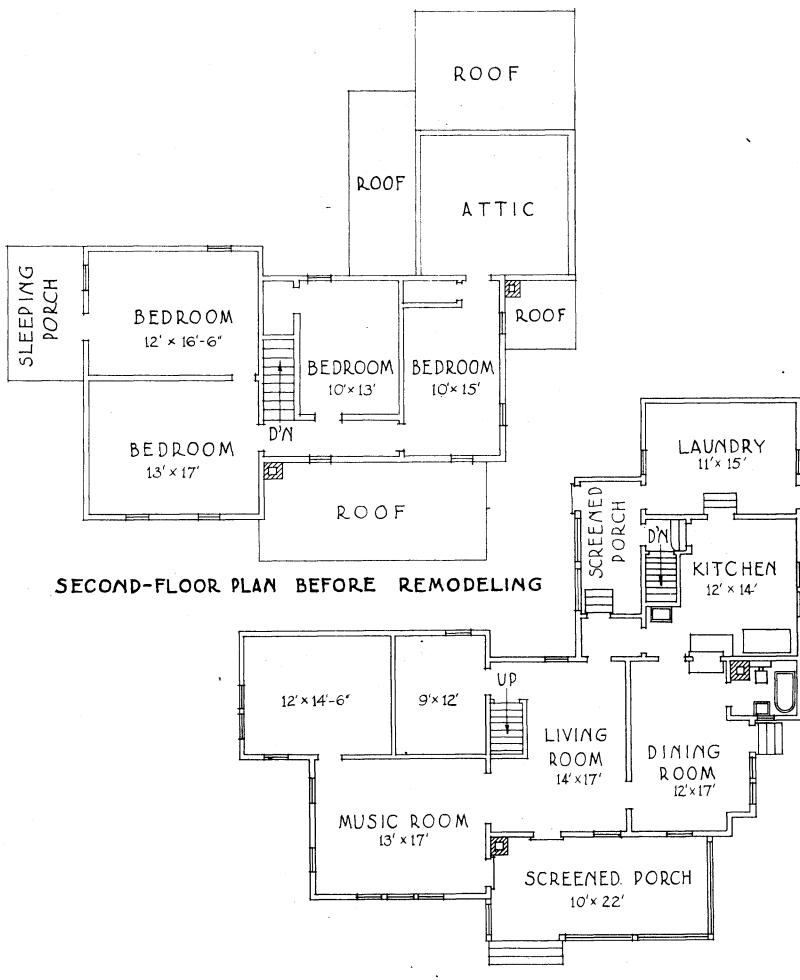


FIGURE 64.—House 18 before the remodeling that made it into separate apartments.

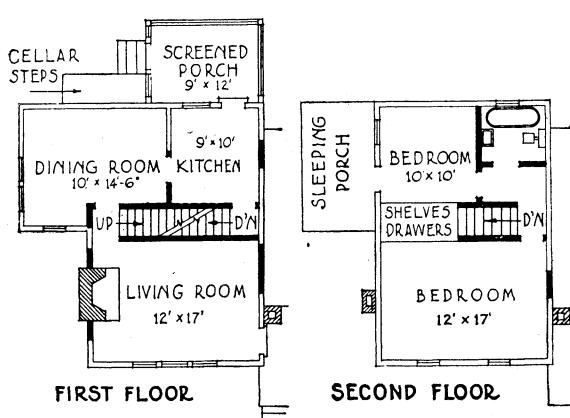


FIGURE 65.—Remodeled wing of house 18